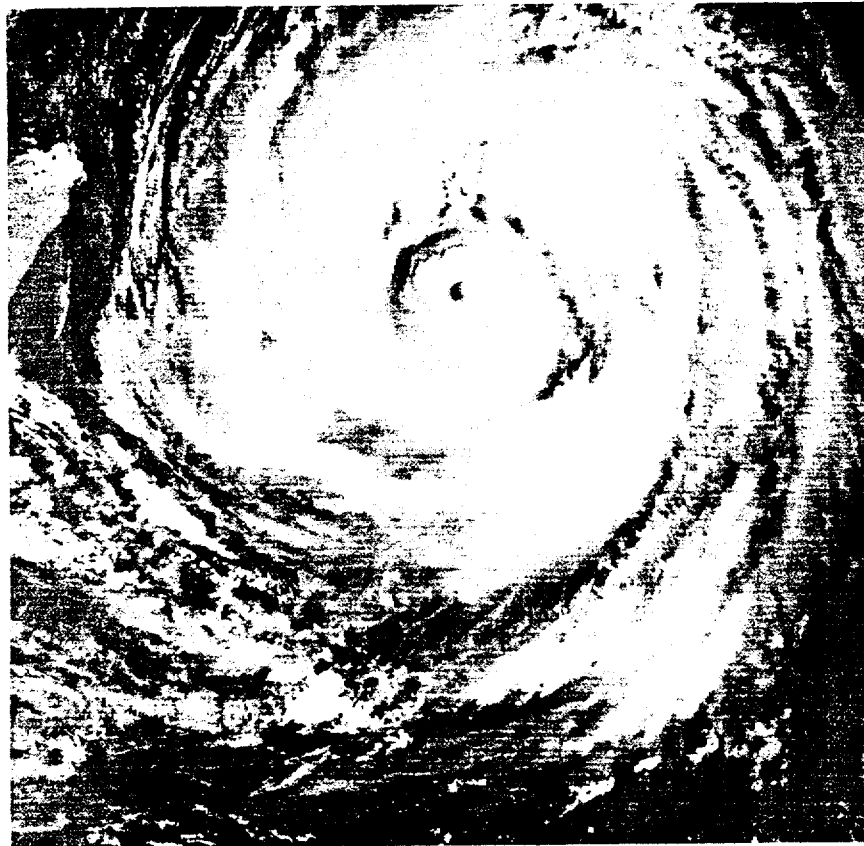


# ANNUAL TYPHOON *Report*



1974

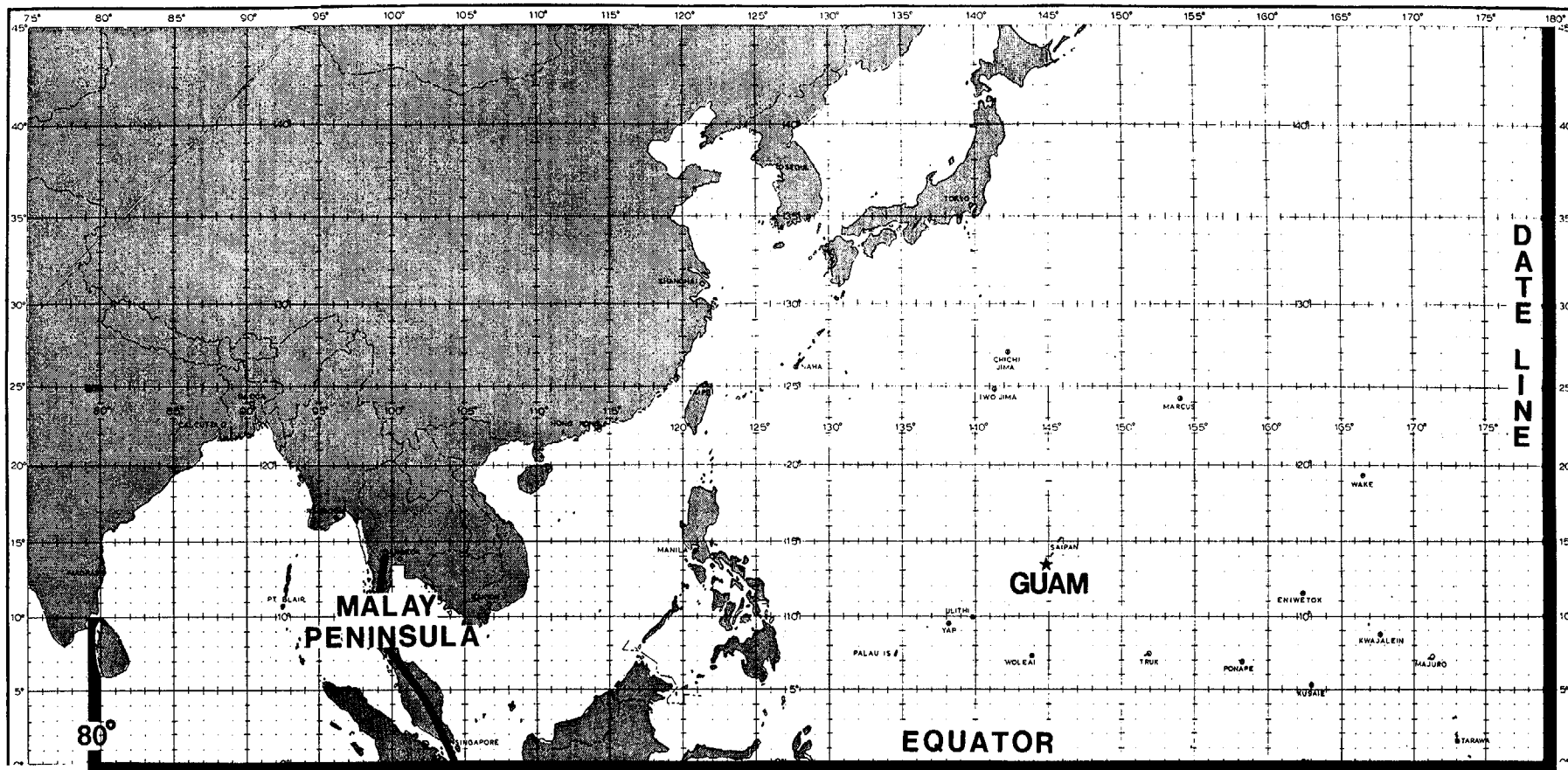


**FLEET WEATHER CENTRAL/JOINT TYPHOON WARNING CENTER**  
**Guam, Mariana Islands**

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**AREAS OF RESPONSIBILITY - JOINT TYPHOON WARNING CENTER, GUAM**  
**Primary (180° West to Malay Peninsula)      Secondary (Malay Peninsula West to 80°E)**

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1974

ANNUAL TYPHOON REPORT

\*Departed during 1974 season



## In Memory Of

CAPT EDWARD REL BUSHNELL - WEATHER OFFICER  
1ST LT GARY WAYNE CRASS - AIRCRAFT COMMANDER  
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U.S. Air Force, 54th Weather Reconnaissance Squadron  
(Swan 38, Bess 0827)

WHO DID NOT RETURN FROM A TYPHOON  
RECONNAISSANCE FLIGHT OVER THE SOUTH CHINA  
SEA 12 OCTOBER 1974

## FOREWARD

The body of this report summarizes western North Pacific tropical cyclones. Annex A summarizes tropical cyclones in the central North Pacific from 180° eastward to 140°W, and Annex B summarizes tropical cyclones in the Bay of Bengal. The U.S. National Weather Service publishes summaries of eastern North Pacific tropical cyclones in the Monthly Weather Review, the Mariners Weather Log, and Pilot Charts.

Fleet Weather Central/Joint Typhoon Warning Center (FLEWEACEN/JTWC), Guam has the responsibility to:

1. Provide warnings for all tropical cyclones north of the equator, west of 180° longitude, and east of 80° E longitude;
2. Determine tropical cyclone reconnaissance requirements and assign priorities;
3. Conduct post-analysis programs including preparation of the Annual Typhoon Report; and
4. Conduct tropical cyclone analysis and forecasting research.

Detachment 17/Asian Tactical Forecast Unit, 20th Weather Squadron, Yokota, Japan (formerly Asian Tactical Forecast Center, Fuchu) coordinating with the Naval Weather Service Facility, Yokosuka, Japan, is designated as the alternate JTWC in case of the incapacitation of FLEWEACEN/JTWC Guam.

The JTWC is an integral part of FLEWEACEN Guam and is manned by four officers and four enlisted men each from the Navy and Air Force. The senior Air Force officer is designated as Director, JTWC, and the senior Navy officer is the JTWC Operations Officer.

The western North Pacific Tropical Cyclones Warning System consists of the Joint Typhoon Warning Center, the U.S. Air Force 54th Weather Reconnaissance Squadron stationed at Andersen AFB, Guam, and Air Force Weather Service Defense Meteorological Satellite Program (DMSP) sites at Nimitz Hill, Guam; Yokota AB, Japan; Kadena AB, Japan; Nakon Phanom Airport, Thailand; Hickam AFB, Hawaii; and the Air Force Global Weather Central, Offutt AFB, Nebraska.

The Central Pacific Hurricane Center, Honolulu, is responsible for the area from 180° eastward to 140°W and north of the equator. Warnings are issued in coordination with FLEWEACEN Pearl Harbor and the Air Force Central Pacific Forecast Center, Hickam AFB, Hawaii.

CINCPACFLT, CINCUSARPAC, and CINCPACAF are responsible for further dissemination and, if necessary, local modification of tropical cyclone warnings to U.S. military agencies.

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# CHAPTER I — OPERATIONAL PROCEDURES

## 1. GENERAL

Services provided by the Joint Typhoon Warning Center (JTWC) include forecasts of tropical cyclone formation, location, intensity, direction and speed of movement, and horizontal extent of critical wind speeds (30 knots or greater). This information was disseminated in 1974 by: (1) Tropical Cyclone Formation Alerts issued whenever interpretation of satellite and synoptic data indicated formation of a tropical cyclone was likely; (2) Tropical Cyclone Warnings issued four times daily whenever a significant tropical cyclone was present in the western North Pacific; (3) Tropical Cyclone Warnings issued twice daily whenever a significant tropical cyclone was present in the Bay of Bengal; and (4) Tropical Weather Summaries issued daily with a detailed description of all significant tropical disturbances.

FLEWEACEN Guam provides computerized meteorological/oceanographic products for JTWC. Communication support is furnished by the Naval Telecommunications Center (NTCC) of the Naval Communications Station, Guam.

## 2. ANALYSES AND DATA SOURCES

### a. COMPUTER PRODUCTS:

Use of the varian plotter by the FLEWEACEN Guam Computer Center during 1974 eliminated some of the JTWC hand plotting effort. Varian charts are produced routinely at synoptic times for the surface, 850 mb, 700 mb, and 500 mb levels. In addition, a chart of upper tropospheric data is produced which uses 200 mb rawinsonde data and AIREPS above 33,000 feet within six hours of the 0000Z and 1200Z synoptic times. Data not in the proper format for the computer are hand plotted on the charts. These include pibal gradient-level winds, satellite-derived winds, and missing or late synoptic reports necessary for a detailed analysis.

In addition, the standard array of synoptic-scale computer analyses and prognostic charts from the Fleet Numerical Weather Central (FNWC) at Monterey, California are available.

JTWC extensively utilized the FLEWEACEN Guam Computer Center for objective forecast techniques and statistical post-analysis.

### b. JTWC ANALYSES:

(1) Gradient-level (3000 feet) streamline analysis (south of 20°N) and isobaric analysis (north of 20°N) at 0000Z and 1200Z.

(2) 500 mb contour analysis at 0000Z and 1200Z.

(3) A composite upper tropospheric streamline analysis utilizing rawinsonde data from 300 mb to 150 mb and AIREPS at or above 29,000 feet at 0000Z and 1200Z.

(4) Reports from weather reconnaissance aircraft are plotted on large-scale sectional charts.

(5) Additional sectional analyses similar to those above, at intermediate synoptic times, during periods of tropical cyclone activity.

### c. SATELLITE DATA:

DMSP satellite data played a major role in the early detection of tropical cyclones in 1974. This aspect, as well as applications of satellite data to tropical cyclone tracking, is discussed in Chapter II.

### d. RADAR:

Land radar reports, when available, were used for tracking tropical cyclones during the 1974 season. Once a storm moved within range of a land radar site, reports were usually received hourly. Use of radar during 1974 is discussed in Chapter II.

## 3. FORECAST AIDS

### a. CLIMATOLOGY:

Various climatological publications listed in earlier Annual Typhoon Reports were utilized in addition to the following recently received publications:

(1) Changes in the Characteristics of Typhoons Crossing the Island of Taiwan (Brand, S. and J. W. Blelloch, 1973).

(2) Handbook for Forecasters in the Bay of Bengal (Cumming, M. J., 1973).

(3) A Tropical Cyclone Analog Program for the North Indian Ocean (Brand, S., J. M. Long, J. W. Blelloch, and G. D. Hamilton, 1974).

(4) Annual Typhoon Reports, 1959-1973 (FWC/JTWC).

### b. OBJECTIVE TECHNIQUES:

During 1974, the following objective forecasting techniques were employed (an evaluation of the techniques is presented in Chapter V):

(1) EXTRAPOLATION - Storm movement is extrapolated by using the past 12-hour mean speed and direction for both 24- and 48-hour forecasts. Forecasts are determined by simple linear extrapolation using the 12-hour old best track position and the current warning position.

(2) MOHATT (modified HATRACK) - Steering by geostrophic winds derived from smoothed height fields at 700 mb and 500 mb levels, biased by 12-hour history inputs.

(3) TYMOD - Steering by global band upper air fields (GBUA) from FNWC Monterey, biased by 12-or 24-hour history inputs.

(4) TYFOON- Analog weighted mean track.

(5) FCSTINT - Uses statistical regression equations to make 24-, 48-, and 72-hour intensity forecasts.

#### 4. FORECASTING PROCEDURES

##### a. TRACK FORECASTING:

An initial forecast track is developed based on persistence, climatology, and objective techniques. This initial track is subjectively modified based on the following:

(1) The objective techniques are evaluated in conjunction with the best steering level.

(2) The prospects for recurvature are evaluated for all westward moving storms. The basic requisites for this evaluation are accurate continuity on mid-latitude troughs and numerical progs to indicate changes in amplitude or movement of troughs and the subtropical ridge. The northward tendency due to internal forces of each storm is also an important consideration.

(3) Steering is further evaluated by considering the latest upper air analyses as representative of the average upper air flow for the past 24-hours. These analyses are roughly 12 hours old thereby approximating the mid-point of the past 24-hour time interval. By this technique actual past 24-hour movement serves to indicate the best steering level as well as the effectiveness of steering.

(4) A final check is made against climatology to ascertain the likelihood of the forecast track. If the forecast is climatologically unusual, the forecast rationale is reappraised and the forecast track adjusted as necessary.

b. For intensity forecasting, heavy reliance is placed on aircraft reconnaissance reports, the Dvorak satellite interpretation model, and the TYFOON and FCSTINT objective techniques. Upper tropospheric outflow, sea surface temperatures, terrain influences, and speed of movement are additional considerations.

#### 5. WARNINGS

Tropical cyclone warnings are numbered sequentially. If warnings are discontinued and the storm reintensifies, as Typhoon Mary did this year, warnings are numbered consecutively from the last warning issued. Amended or corrected warnings are given the same number as the warnings they modify plus a sequential alphabetical designator to indicate that it is an amended warning. In 1974, a variable warning time was employed to maximize the use of all available reconnaissance platforms and permit flexibility in spreading the warning workload during multiple storm situations. Warnings within the JTWC primary area of responsibility are issued within two hours of 0000Z, 0600Z, 1200Z, and 1800Z with the constraint that two consecutive warnings may not be more than seven hours apart.

The forecast intervals are 12 and 24 hours for tropical depressions and 12, 24, 48, and 72 hours for typhoons and tropical storms. Warnings in the JTWC secondary area of responsibility are issued within two hours of 0800Z and 2000Z with the constraint that two consecutive warnings may not be more than 14 hours apart. Warnings for the secondary area are issued only after a tropical cyclone has reached an intensity of 34 knots or greater. The forecast intervals are 24 and 48 hours.

The variable warning time was utilized for 227 warnings out of a possible 657 or for 34.6% of the warnings. Only 29 of these 227 warnings were  $\pm 2$  hours from the normal warning times of 0000Z plus every 6 hours. The remainder of the variable warnings were within  $\pm 1$  hour of the normal warning times. Of the 173 levied satellite fixes during 1974, 81 were made possible by use of the variable warning time. If the variable warning time had not been available, these 81 fixes would have been levied on aircraft or land radar (if available) and the levy rate for satellite would have been 17.3% instead of the actual 32.5%.

Forecast periods are stated with respect to warning time. Thus, a 24-hour forecast normally verifies 26-28 hours after the latest aircraft or satellite fix and 30-36 hours after the latest surface synoptic chart and upper air charts.

Warning forecast positions are verified against the corresponding post analysis "best track" positions. A summary of verification results for 1974 is presented in Chapter V.

#### 6. PROGNOSTIC REASONING MESSAGE

Whenever warnings for typhoons and tropical storms are issued, a prognostic reasoning message is transmitted at 0000Z and 1200Z for the JTWC primary area of responsibility. This message is intended to provide field meteorologists with the reasoning behind the latest JTWC forecasts.

#### 7. TROPICAL WEATHER SUMMARY

This message, summarizing atmospheric conditions in the JTWC area of responsibility, is issued at 0600Z daily from 1 June to 30 November, and otherwise when the threat of tropical cyclone development exists or when warnings are being issued. It contains a detailed description of all significant tropical disturbances and JTWC's evaluation of potential for development.

#### 8. TROPICAL CYCLONE FORMATION ALERT

Alerts are issued whenever interpretation of synoptic and other meteorological data suggests that formation of a significant tropical cyclone is likely. These alerts are valid for up to 24 hours unless cancelled or reissued.

## CHAPTER II — RECONNAISSANCE & COMMUNICATION

### 1. GENERAL

The foundation of any good tropical cyclone warning is accurate and timely fixes. Because of the vastness of JTWC Guam's area of responsibility and the limited number of land or ship reporting stations, JTWC must rely on two primary means of fixing tropical cyclones, namely aircraft and satellite. Aircraft reconnaissance and satellite derived data provided approximately 88 percent of the required fix data in 1974. This year saw greatly increased utilization of DMSP data with satellite data providing the basis of 44 percent of the warning positions. This increase was primarily a result of the variable warning time, which allowed more flexibility in reconnaissance planning and increased usage of DMSP data.

### 2. RECONNAISSANCE RESPONSIBILITY AND SCHEDULING

Aircraft weather reconnaissance is performed in the JTWC area of responsibility by the 54th Weather Reconnaissance Squadron (54 WRS). The squadron, presently equipped with eight WC-130 aircraft, is located at Andersen Air Force Base, Guam. The JTWC reconnaissance requirements are sent daily during the typhoon season to the Tropical Cyclone Aircraft Reconnaissance Coordinator. These requirements include areas to be investigated, fix times and forecast position of cyclones to be fixed at those times.

Four fixes per day, at six-hourly intervals, are required (CINCPACINST 3140.1M) on all significant tropical cyclones in the JTWC primary area of responsibility (see inside front cover). Two fixes per day are required in the secondary area of responsibility. During the 1974 season, increased use was made of the Selective Reconnaissance Program (SRP) to fulfill these requirements. The SRP was implemented in 1972 to alleviate pressure on overtaxed aircraft reconnaissance assets. The SRP attempts to optimize the entire reconnaissance system by using each reconnaissance platform (aircraft, satellite, and surface radar) to its full potential. Various factors are considered in selecting which reconnaissance platform to use for any warning, e.g., the cyclone's location and stage of development, the DMSP orbit times and areal coverage, availability of land radar reports, the cyclone's threat to U.S. interests, aircraft operational limitations (e.g., one-fix versus two-fix mission), etc.

Use of the variable warning time was instrumental during the 1974 season in optimizing use of DMSP satellite data. Warnings were scheduled within two hours of the standard warning times with the constraint that no more than seven hours may elapse between two consecutive warnings. Thus, JTWC often was able to use satellite fixes which would not have been timely under a less flexible warning system as a basis for many warnings.

Aircraft reconnaissance remains the only method of accurately determining measurable storm parameters. Only the aircraft can provide direct measurements of height, temperature, flight level winds, sea level pressure, and numerous other parameters. These data are vital to the forecaster for indications of changing cyclone characteristics, thus providing a broader basis for tropical cyclone warnings. The aircraft also provides much greater flexibility in time and space compared to the other platforms.

DMSP satellites provide day and night coverage of the JTWC area of responsibility. Interpretation of DMSP satellite imagery provides estimates of cyclone positions and, for daytime passes, estimates of intensities using the DVORAK Technique (NOAA TECHNICAL MEMORANDUM, NESS-45). A major disadvantage of the satellite is that until a storm has an eye, fix positions can vary significantly depending on the analyst, thus creating possible confusion as to the actual movement of the cyclone. In addition, satellites provide no direct measurements of parameters related to cyclone intensity nor do they give any reliable indication of various wind radii.

Land radar provides useful positioning data on well developed cyclones when in the proximity (usually within 200 nm of radar position) of the Republic of Philippines, Hong Kong, Taiwan, or Japan (including the Ryukyus). Radar does not, however, provide measurements or estimates of tropical cyclone intensity. Subsequent sections summarize the JTWC utilization of the various reconnaissance platforms during 1974.

### 3. AIRCRAFT RECONNAISSANCE EVALUATION CRITERIA

The following criteria are used to evaluate reconnaissance support to JTWC.

a. Six-hourly fixes - To be counted as made on time, a fix must satisfy the following criteria:

(1) Fix must be made not earlier than 1 hour before, nor later than 1/2 hour after scheduled fix time.

(2) Aircraft in area requested by scheduled fix time, but unable to locate center due to:

- (a) Cyclone dissipation; or
- (b) rapid acceleration of the cyclone away from the forecast position.

(3) If penetration not possible due to geographic or other flight restrictions, aircraft radar fixes are acceptable.

b. Levied 6-hourly fixes made outside the above limits are evaluated as follows:

(1) Early-fix is made within the interval from 3 hours to 1 hour prior to scheduled fix times; however, no credit will be given for early fixes made within 3 hours of the previous fix.

(2) Late-fix is made within the interval from 1/2 hour to 3 hours after scheduled fix time.

c. When 3-hourly fixes are levied, they must satisfy the same time criteria discussed above in order to be classified as made on time. Three-hourly fixes made that do not meet the above criteria are classified as follows:

(1) Early-fix is made within the interval from 1 1/2 hours to 1 hour prior to scheduled fix time.

(2) Late-fix is made within the interval from 1/2 hour to 1 1/2 hours after scheduled fix time.

d. Fixes not meeting the above criteria are scored as missed.

e. Levied fix time on an "as soon as possible" fix is considered to be:

(1) Sixteen hours plus estimated time enroute after an alert aircraft and crew are levied; or

(2) Four hours plus estimated time enroute after the DTG of message levying an ASAP fix if an aircraft and crew, previously alerted, are available for duty.

f. Investigatives - to be counted as made on time, investigatives must satisfy the following criteria:

(1) The aircraft must be within 250 nm of the specified point by the scheduled time.

(2) The specified flight level and track must be flown.

(3) Reconnaissance observations are required every half-hour in accordance with AWSM 105-1. Turn and mid-point winds shall be reported on each full observation within 250 nm of the levied point.

(4) Observations are required in all quadrants unless a concentrated investigation in one or more quadrants has been specified.

(5) Aircraft must contact JTWC before leaving area of concern.

g. Investigatives not meeting the time criteria of paragraph f, will be classified as follows:

(1) Late-aircraft is within 250 nm of the specified point after the scheduled time, but prior to the scheduled time plus 2 hours.

(2) Missed-aircraft fails to be within 250 nm of the specified point by the scheduled time plus 2 hours.

#### 4. AIRCRAFT RECONNAISSANCE SUMMARY

Aircraft reconnaissance was levied 351 times to make six-hourly fixes on tropical cyclones in 1974. This is an increase of 124 levied fixes over 1973 and represents 66% of the levied six-hourly fixes before the cyclone passed the no-fly line. The remaining required fixes were levied against satellite (32.5%) or land radar (1.5%) as available. The increase in levied aircraft fixes during 1974 was due to the much higher level of tropical cyclone activity compared to 1973 (the year of lightest activity since JTWC was established in 1959). Nevertheless, the percentage increase in levied six-hourly aircraft fixes from 1973 to 1974 (54.6%) was significantly less than the percentage increase in warnings (68.5%) due to the greater use of DMSP data for fixes during 1974.

In addition to the levied six-hourly fixes, 30 investigatives and 7 intermediate fixes were levied by JTWC in 1974. The use of DMSP satellite data in conjunction with synoptic data resulted in only 4 levied investigatives on suspect areas that did not develop into tropical cyclones.

Table 2-1 summarizes reconnaissance effectiveness. Using the scoring criteria in Section 3, the 30 missed fixes (or 8.4% of the total levied fixes) represent a slight increase over 1973. Significantly, approximately one-half of the 1974 missed fixes occurred after mid-October, when the 54th Weather Reconnaissance Squadron was reduced to eight aircraft.

TABLE 2-1. AIRCRAFT RECONNAISSANCE EFFECTIVENESS

	NUMBER OF FIXES	PERCENT
COMPLETED ON TIME	292	81.5
EARLY	1	.3
LATE	35	9.8
MISSED	30	8.4
TOTAL	358	100.0

#### LEVIED VS. MISSED FIXES

	LEVIED	MISSED	PERCENT
AVERAGE 1965-1970	507	10	2.0
1971	802	61	7.6
1972	624	126	20.2
1973	227	13	5.7
1974	358	30	8.4

#### 5. RADAR RECONNAISSANCE SUMMARY

The 1974 typhoon season produced the largest number of radar reports ever received at JTWC during a single season. A total of 997 radar reports of tropical cyclone positions were received; 995 from land stations<sup>1</sup> and 2 from aircraft. No ship radar reports were received during the 1974 Typhoon season. The large number of radar reports is primarily a result of the track and speed of the storms. Of the sixteen tropical storms and typhoons that came under the surveillance of radar, seven,

Gilda, Jean, Mary, Polly, Rose, Shirley, and Wendy, had tracks within radar range of Japan and the Ryukyu Islands, where the Japanese Meteorological Agency has established an extensive and highly reliable radar network. These seven storms accounted for 78% of all radar reports. Typhoon Shirley, which slowly meandered from central Ryukyus to southern Japan, alone accounted for 225 reports, nearly 23% of the total. During one period, Typhoon Polly was simultaneously surveyed by five radar sites.

To evaluate the quality of the 1974 radar data, the land radar reports were separated into the three categories of accuracy defined in the WMO radar code. These categories are: good (within 10 km; 5.4 nm), fair (within 10-30 km; 5.4-16.2 nm) and poor (within 30-50 km; 16.2-27 nm). Of the 995 reports, 34% were good, 38% were fair and 28% were poor. Consideration of radar reports made only while storms were of typhoon intensity yielded 45% in the good category. All land radar reports were compared to the JTWC best track position and the mean deviation was 12.0 nm. This is identical to the mean deviation obtained during the 1973 season which utilized only 409 land radar reports. The mean deviation of radar reports taken while storms were of typhoon intensity was also 12.0 nm.

Of the 995 land radar reports, 75.3% were obtained from sites in Japan and the Ryukyu Islands, 17.0% from the Philippines, 6.4% from the Royal Observatory at Hong Kong, 0.5% from Taiwan and 0.4% from each Guam and Korea. Although Hong Kong exhibited only a small percentage of reports, these provided valuable positioning information for 6 storms west of the Air Weather Service no-fly line. Sites in Taiwan and Korea provided similar information for Lucy and Wendy. Radars of National Meteorological Agencies accounted for 64% of all reports, AC&W sites 12% and Air Weather Service stations 24% (primarily from Kadena AFB, Okinawa and Clark AFB, Philippines), a 16% increase over the 1973 AWS contribution.

Communication problems in the Philippines resulted in the absence of any radar reports during the passages of Bess and Elaine across northern Luzon, although the storms were within range of four radar sites and very close to two of these. There remains a critical need for radar coverage on the east coast of Luzon and in the Luzon Straits. Hopefully, the site at Catanduanes Island and a new site (BASCO) in the Bataan Islands will be operational by the latter part of the 1975 Typhoon season.

## 6. SATELLITE RECONNAISSANCE SUMMARY

The use of DMSP satellite data for tropical cyclone reconnaissance provided by U.S. Air Force DMSP sites increased dramatically during 1974. The levy rate for satellite fixes increased to 32.5% compared with 15.4% in 1973. Since there are a number of situations each year when a choice of platforms is not possible (e.g., when cyclones are past the no-fly line near the Asian coast), the actual use rate of

- 1 A list of land radar sites is located in the "Tropical Cyclone Center Fix Data" portion of this report.

DMSP data for warnings is always significantly higher than the levy rate. During 1974, the use rate increased to 43.8% from 27.4% in 1973. Three factors are responsible for this large increase in the use of satellite data. First, 1974 was a much more active season than 1973, placing a much greater load on available aircraft reconnaissance assets. Selectively using DMSP data for many fixes takes some pressure off the aircraft reconnaissance resources and helps insure that aircraft fixes will be available when needed most. Second, there were always at least two DMSP spacecraft operational during 1974 and during the heart of the primary season (August through November) data were available from three satellites. Thus, during 1974, satellite coverage was available for 88% of the six-hourly warning cycles compared to only 58% during 1973. The third and dominant factor in the increased use of satellite data was the use of the variable warning time option described in Chapter I.

The DMSP satellite network continued to operate smoothly during 1974. DMSP sites made 1203 position estimates on tropical cyclones in the western North Pacific area compared with 605 during 1973. Once-daily intensity estimates derived from the Dvorak technique (NOAA TM, NESS-45) were also computed. Additionally, hundreds of other satellite analyses were made on tropical disturbances and tropical cyclones in their pre-warning stages. The primary network sites during 1974 were Nimitz Hill, Guam; Fuchu, Japan; and Nakon Phanom, Thailand (NKP). Kadena, Japan and AFGWC served as backup sites for the western North Pacific. Additionally, NKP and AFGWC provided DMSP coverage of tropical cyclone activity in the Bay of Bengal. Late in 1974, the Fuchu site was relocated to Yokota Air Base, Japan. The Kadena site has been returned to a fully operational status and will be a primary site during the 1975 season.

DMSP derived positions of tropical cyclones are separated into six classes according to the method of gridding and type of apparent circulation center. These classes are identified by the Position Code Number (PCN) system shown below.

PCN	CLASS
1	Visible Eye/Geographical Gridding
2	Visible Eye/Ephemeris Gridding
3	Well Defined Circulation Center/Geographical Gridding
4	Well Defined Circulation Center/Ephemeris Gridding
5	Poorly Defined Circulation Center/Geographical Gridding
6	Poorly Defined Circulation Center/Ephemeris Gridding

Each derived DMSP position is compared to the JTWC best track position for the corresponding time. The mean deviations between the satellite positions and best track positions for the past three years are shown in Table 2-2. The statistics for 1973 and 1974 are for all sites because the DMSP



satellite network was operational for these years. The statistics for 1972, however, are limited to the Guam site since only positions from the Guam sites were used in the Selective Reconnaissance Program that year and standardized positioning techniques had not been made available to all sites.

Table 2-2. Mean Deviations (nm) of DMSP Derived Tropical Cyclone Positions from JTWC Best Track Positions, 1972-1974. Number of cases shown in parentheses.

PCN	1972 (GUAM)	1973 (ALL SITES)	1974 (ALL SITES)
1	14.2(104)	15.5(129)	13.6(224)
2	15.8( 53)	20.0( 17)	17.4( 37)
3	21.3(100)	20.3(252)	20.1(422)
4	20.2( 39)	20.0( 24)	23.9( 70)
5	29.9(137)	45.9(163)	35.4(342)
6	30.4(157)	29.6( 20)	49.4(108)
1&2	14.7(157)	16.0(146)	14.2(261)
3&4	21.0(139)	20.3(276)	20.6(492)
5&6	30.2(294)	44.1(183)	38.8(450)
TOTAL	23.9(590)	26.4(605)	26.0(1203)

The increase in the mean deviations of the poorly defined cases (PCN 5&6) in 1973 and 1974, compared to 1972, is significant. With more experience in DMSP data interpretation and use of various thresholding techniques to amplify the mesoscale features near the cyclone's circulation center, many of the cases that would have been classified as poorly defined in 1972 could be classified as well defined in 1973 and 1974. This did not increase the mean deviations in the well defined category (PCN 3&4); however, it did increase the mean deviations in the poorly defined category since cases in this category during 1973 and 1974 were truly poorly defined. The percent of cases in the poorly defined category was 50% in 1972, 30% in 1973, and 37% in 1974. Poorly defined cases are much more frequent at night due to the coarser resolution of the infrared sensors, e.g., during 1974, 50% of night cases were poorly defined compared to 26% of the daytime cases. The percent of cases with visible eyes (PCN 1&2) has remained relatively stable: 27% in 1972, 24% in 1973, and 22% in 1974.

The 1974 positioning statistics for the individual DMSP sites are given in Table 2-3. There is little difference among the sites in positioning accuracies. These statistics and those in Table 2-2 indicate that the DMSP PCN classification system is stable, reliable, and reproducible by independent analysts following standardized guidance (1 WWP 105-10, Tropical Cyclone Position and Intensity Analysis Using Satellite Data).

Once-daily tropical cyclone intensity estimates are made from the daytime DMSP data using the Dvorak technique. This technique assigns a Current Intensity (CI) number to the cyclone depending on the cyclone's Central Features (CF), Banding Features (BF), and continuity considerations from previous analyses. Following are the Maximum Wind Speeds (MWS) associated with each CI number.

Table 2-3. Mean Deviations (nm) of DMSP Derived Tropical Cyclone Positions from JTWC Best Track Positions for Western North Pacific DMSP Sites during 1974. Number of cases shown in parentheses.

PCN	GUAM	YOKOTA	NAKON	PHANOM	KADENA
1&2	12.6(116)	15.7( 72)	14.3( 36)	11.7(26)	
3&4	20.0(231)	21.3(175)	19.6( 54)	18.7(24)	
5&6	35.4(206)	46.2(118)	37.0( 94)	38.5(31)	
TOTAL*	24.2(553)	28.3(365)	27.5(184)	24.0(81)	

\*20 less than 1974 totals in Table 2-2 which includes some positions from AFGWC.

CI	MWS(Knots)	CI	MWS(Knots)	CI	MWS(Knots)
1.5	25	4.0	60	6.5	122
2.0	30	4.5	72	7.0	135
2.5	35	5.0	85	7.5	150
3.0	40	5.5	97	8.0	170
3.5	50	6.0	110		

Figure 2-1 shows a comparison of the derived intensities with the JTWC Best Track (BT) intensities for 1974. The BT intensities were placed into the closest corresponding CI category and deviations computed according to CI numbers. Overall, 74% of the cases fell within  $\pm 0.5$  CI number and 91% of the cases within  $\pm 1.0$  CI number. There was a tendency for the DMSP intensity estimates to be slightly higher than the BT wind speeds.

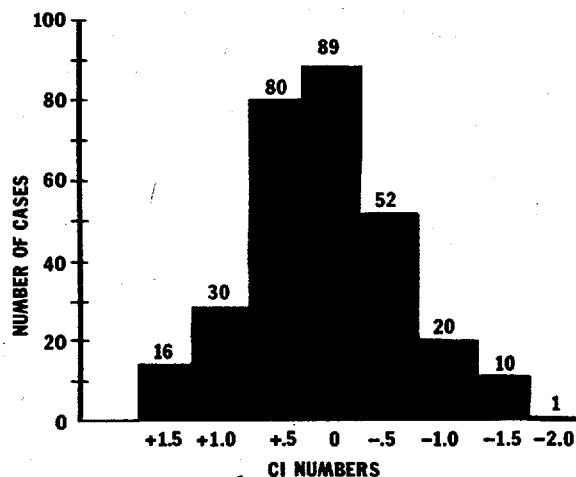


FIGURE 2-1. Comparison of derived CI number\* and JTWC BT intensities.

\*Nimitz Hill site only

The greatest benefit from DMSP data has been the significant increase in JTWC's ability to forecast tropical cyclone development. By carefully monitoring daily changes in tropical disturbances, JTWC can normally give at least 12 to 24 hours notice that a significant tropical cyclone

is developing. When development during the next 24 hours is judged likely, a tropical cyclone formation alert is issued giving the current location, the estimated maximum winds in the disturbance, and the area where development is likely to occur. Formation alerts are updated as necessary until the cyclone is picked up in warning status or canceled if the disturbance fails to develop. Table 2-4 shows the verification rate of tropical cyclone formation alerts for the past five years. A significant increase in the verification rate occurred in 1971, the first season for which DMSP data was available. Subsequent increases can be attributed to increased skill in interpreting the DMSP imagery and close integration of satellite and conventional meteorological data.

Table 2-4. VERIFICATION SUMMARY FOR TROPICAL CYCLONE FORMATION ALERTS

YEAR	NUMBER OF ALERT SYSTEMS	ALERT SYSTEMS WHICH BECAME NUMBERED TROPICAL CYCLONES	TOTAL NUMBERED TROPICAL CYCLONES	DEVELOPMENT RATE
1970	32	18	27	56%
1971	48	33	37	69%
1972	41	29	32	71%
1973	26	22	23	85%
1974	35	30	35	86%

Due to the use of DMSP data to monitor tropical disturbances in their developing stages, the need for aircraft investigative flights has been greatly reduced resulting in considerable savings of aircraft reconnaissance resources in recent years. Table 2-5 presents a summary of levied investigative flights during the past five years. During the past two years, the ratio of levied investigative flights to the total number of tropical cyclones has been near unity. In most cases during 1973 and 1974, the investigative flight provided the basis for the first warning on the tropical cyclone.

Table 2-5. SUMMARY OF AIRCRAFT INVESTIGATIVE FLIGHTS

YEAR	LEVIED INVESTIGATIVE FLIGHTS	TOTAL TROPICAL CYCLONES	RATIO
1970	170	27	6.3-1
1971	179	37	4.8-1
1972	81	32	2.5-1
1973	28	23	1.2-1
1974	30	35	0.9-1

Some simple calculations illustrate the magnitude of aircraft reconnaissance savings

during the developing, pre-warning stages of tropical cyclones. Multiplying the average ratio of investigative flights to tropical cyclones experienced during 1970 and 1971 of 5.5 to 1 times 34 (the average yearly number of tropical cyclones including tropical depressions) results in a requirement of 187 investigative flights in an average year without DMSP data. With DMSP data a ratio of unity can be achieved requiring only 34 investigative flights in an average year. Thus, average savings of 153 investigative flights per year can be achieved. A normal 10 to 12 hour investigative flight is equivalent to a mission making two consecutive six-hourly fixes. Thus, an equivalent savings of 306 six-hourly fixes are realized. When this figure is compared to the average number of levied six-hourly fixes (534) during the last 10 years, the large savings of aircraft resources during the early developing stages of tropical cyclones becomes evident. This use of DMSP data during the pre-warning stages of cyclones and selective use of DMSP data for six-hourly fixes once a cyclone has developed helps explain why the large reductions in aircraft reconnaissance assets have not yet degraded the tropical cyclone warning service. The primary problem facing JTWC in future years will be to optimize the mix of reconnaissance assets so that the maximum capabilities of each resource can be realized.

DMSP satellites have become a vital part of the tropical cyclone warning system during the past few years. Their loss now that the aircraft reconnaissance assets have been drastically reduced would seriously degrade JTWC's warning capabilities. The overall use of DMSP satellite data for warnings should increase in future years; however, the very large increase in satellite use from 1973 to 1974 was due primarily to the one-time benefit of the variable warning time option and increases in future years will probably be at a much slower rate. Also, the potential DMSP satellite use rate is heavily dependent on the number and orbit time of the satellites. During periods when only one DMSP satellite is operational, the potential use rate drops sharply and JTWC's flexibility in optimizing a mix of aircraft and satellite data is greatly reduced.

## 7. COMMUNICATIONS

### a. AIR TO GROUND

Aircraft reconnaissance data are normally received by JTWC via direct phone patch through Andersen Aeronautical Station, which is the primary station for this purpose. Under degraded radio propagation conditions, the Clark or Fuchu aeronautical stations can intercept and relay the data via AUTOVON and teletype to JTWC.

Average communication delays for the preliminary and complete center data messages for past years are compared with 1974 delays in Figure 2-2. Delay times are defined as the difference between the fix time and the time of message receipt at JTWC. The preliminary fix message continued to prove its effectiveness by permitting a significant amount of extra time to be spent in forecast preparation.

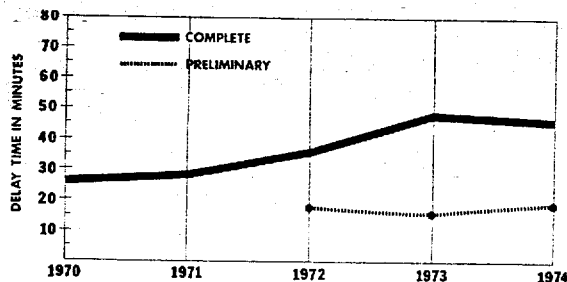


FIGURE 2-2. DELAY TIMES - Receipt of eye data messages.

Table 2-6 depicts the complete center data messages received more than one hour after fix time and after warning time. The decrease in the latter can be directly attributed to the variable warning time introduced in 1974.

TABLE 2-6. 1974 AIR/GROUND DELAY STATISTICS FOR AIRCRAFT RECONNAISSANCE COMPARED WITH PREVIOUS YEARS

	1970	1971	1972	1973	1974
% Complete fix messages delayed over one hour	5	6	6	20	19
% Complete fix messages received after warning time	0.9	2.1	5.5	10.1	4.9

#### b. SELECTIVE RECONNAISSANCE PROGRAM

With the advent of the SRP, the importance of radar and satellite fix data has increased considerably over previous years. A review of the associated communication delays follows with delay times defined as the difference between the observation time and the time of message entry into the AWN. In contrast to previous years, radar reports were received in a very timely manner. Data from the AC&W radar sites in the Philippines and data from nationally operated radars of the Republic of China, Hong Kong, Japan, and the Republic of the Philippines were delayed an average of only 20 to 35 minutes. In the worst cases, JTWC still received the messages within 80 minutes of observation time. Tropical cyclone radar data is routed to JTWC over the AWN through the use of a special high precedence collective indicator. Additionally the AC&W radar reports were phoned to JTWC from Clark AB, thereby providing the information somewhat earlier than indicated.

Over 1557 position and intensity estimates were derived from Air Weather Service (AWS) DMSP sites and the aircraft

carrier USS CONSTELLATION during 1974. The data from the AWS DMSP sites were immediately passed via AUTOVON followed by an AWN message. AUTOVON provided rapid communication of the essentials and a brief two-way discussion of the data (a benefit not possible by message). Average delay times of 65 minutes for telephone and 84 minutes for message resulted from a sampling of mid-season storms. These delay times are the difference between satellite equator-crossing time and the time of the telephone call or entry of the message into the AWN. Systematic differences in data processing time among the DMSP sites introduces small variations in the above figures which are independent of communications and analysis time.

#### c. OUTGOING COMMUNICATIONS

Messages originating at JTWC are processed by the Naval Telecommunications Center (NTCC) of the Naval Communications Station, Guam. By special agreement, all tropical cyclone warnings are placed in the communications system before pending IMMEDIATE precedence traffic. Manual processing is accomplished as though the warning had FLASH precedence. Warnings were delivered to the message center an average of 28 minutes before warning time. In Figure 2-3, yearly averages of the handling time are plotted relative to warning time as indicated by the length of vertical bars. Handling times for tropical depression warnings (not shown) were reduced from 25 minutes in 1973 to 9 minutes in 1974.

The dramatic improvement in handling time achieved during 1973 continued into 1974, thereby allowing the average message to be placed on the circuits before the established warning time. The time of receipt of a warning at a particular station depends on factors beyond the control of either JTWC or NTCC.

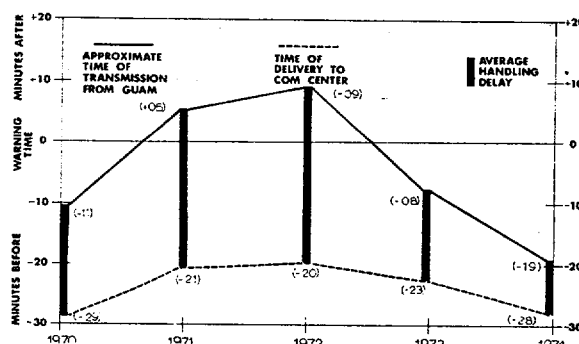


FIGURE 2-3. AUTODIN handling time data for typhoon and tropical storm warnings.

## CHAPTER III — RESEARCH SUMMARY

### 1. GENERAL

One of the three major tasks of the Joint Typhoon Warning Center is to conduct tropical cyclone analysis and forecasting research. In most cases the research projects are directly concerned with either movement or intensity forecast improvement. Meteorologists from outside agencies such as the Environmental Prediction Research Facility, the Naval Postgraduate School, the 54th Weather Reconnaissance Squadron and Detachment 1, 1st Weather Wing often collaborate with JTWC on research projects. The following briefs summarize significant research completed during the past year. Research underway but not yet completed is not reported in this section.

### 2. COST EFFECTIVENESS EVALUATION OF DROPSONDE DERIVED SEA LEVEL PRESSURES IN TROPICAL CYCLONES OF THE WESTERN NORTH PACIFIC

(Reference: McPeck, R. E. and O. R. Scrivener, FLEWEACEN/JTWC Technical Note 74-6).

From the earliest days of aircraft reconnaissance of tropical cyclones, dropsonde data taken in the cyclone centers showed a very high correlation between dropsonde measured surface pressure and aircraft measured 700-mb height. Jordan (1957) studied this correlation and derived a regression equation that has been used operationally for many years as an initial estimate of surface pressure by Joint Typhoon Warning Center (JTWC), Guam. Sea level pressure measurement is an important tool in deriving maximum surface wind speeds in tropical cyclones. In the light of present day forecasting techniques and ever tightening budgetary constraints, this study was undertaken to determine the feasibility of relying solely on a regression equation to derive sea level pressure from aircraft measured 700-mb heights.

Results showed that Jordan's regression equation can be used operationally for determining tropical cyclone intensity. By using the equation for minimum sea level pressure estimates, instead of dropsonde measured sea level pressure, a dollar savings of approximately \$100,000 would be realized in the Western North Pacific each year.

### 3. DERIVATION OF A REVISED MAXIMUM WIND/MINIMUM SEA LEVEL PRESSURE RELATIONSHIP FOR TROPICAL CYCLONES

(Reference: Atkinson, G. D. and C. R. Holliday, FLEWEACEN/JTWC Technical Note 75-1).

A revised minimum sea level pressure/maximum sustained surface wind relationship for tropical cyclones for the Western North Pacific is derived. The data sample used was 26 years of peak wind gust observations from

island and coastal meteorological stations which experienced tropical cyclone hits. Minimum sea level pressures were determined from station pressure data and aircraft reconnaissance observations. The recorded peak gust values were adjusted for differences in station and anemometer elevation and reduced to sustained (one-minute average) surface winds using standard gust factor relationships. The resulting equation is:

$$V_{\max} = 6.7 (1010 - P_c) \quad 0.644$$

Where  $V_{\max}$  is the maximum sustained surface wind and  $P_c$  is the minimum sea level pressure. The standard error of the regression equation on the dependent data is 8.8 knots and 75% of the cases fell within + 10 knots of the regression line. Due to the availability of better ground truth observations of maximum surface winds, this relationship is considered more accurate than previous minimum pressure/maximum wind relationships which were derived primarily from maximum surface winds estimated from aircraft reconnaissance sea state observations. The new relationship has been adopted for operational use by JTWC and is used in conjunction with maximum flight level (700 mb) winds and satellite intensity estimates to determine the maximum sustained wind speeds in tropical cyclones. The maximum wind values derived from this equation can be adjusted subjectively for synoptic situations in which the environmental pressures on the cyclone's periphery are abnormally high or low. Table 3-1 gives the pressure/wind relationships derived from the equation.

TABLE 3-1. MAXIMUM SUSTAINED (ONE-MINUTE AVERAGE) SURFACE WIND SPEEDS (MWS) (KNOTS) FOR SPECIFIED VALUES OF MINIMUM SEA LEVEL PRESSURE (MSLP) (mb).

MSLP	MWS	MSLP	MWS	MSLP	MWS
1000	30	960	83	920	122
995	38	955	89	915	126
990	46	950	94	910	130
985	53	945	99	905	134
980	60	940	103	900	138
975	66	935	108	895	142
970	72	930	113	890	146
965	78	925	117	885	150

### 4. FORECAST VERIFICATION AS A FUNCTION OF RECONNAISSANCE PLATFORM

(Reference: Harrison, E. J., Jr., and A. L. Bryant, FLEWEACEN/JTWC Technical Note 75-2)

There has been much discussion in recent years as to the effect of reconnaissance platforms on forecast position accuracy, e.g., will a 24-hour forecast based on an aircraft fix be more accurate than one based on satellite? This study compares the mean warning position and forecast accuracies for JTWC warnings based on aircraft, satellite, radar and other fixes for the 1973 and 1974 seasons. The single most important result of

the study is that warnings based on aircraft fixes are, in the mean, more accurate. The main reason for this is the ability of the aircraft to locate the storm center, regardless of the stage of cyclone development. When storms are well developed, there is essentially no difference in forecast accuracy between warnings based on aircraft and satellite; however, in the poorly developed storms aircraft-based warnings are considerably (approximately 22%) more accurate. The study indicates that continued use of the Selective Reconnaissance Program will provide the most accurate position forecasts possible, while optimizing utility of dwindling aircraft assets.

# CHAPTER IV — SUMMARY OF TROPICAL CYCLONES

## 1. GENERAL RESUME

During 1974, there was a sharp reversal from the abnormally light tropical cyclone activity observed during 1973. Named tropical cyclones numbered 32 during 1974 (Table 4-1) which is 10% higher than the latest 15-year average<sup>1</sup> displayed in Table 4-2. Climatological statistics on typhoons are given in Table 4-3. Less than half (47%) of these tropical storms developed to typhoon strength (15)--well below the average ratio of 65% derived from the long term average (Table 4-4). Deviation of normal monthly typhoon distribution was particularly noticeable during July and August when only

3 were recorded in contrast to the climatological average of 7.

Warnings were issued in 1974 on numbered tropical cyclones during 148 calendar days spanning all months except February. This closely matches the mean of the past 15 years (Table 4-5) but is a significant increase (almost twice) over the number of warning days during 1973.

The number of typhoon days (Table 4-6), however, numbered only 62, well below the 15-year average of 90 days. This reflects the tendency of this season's tropical cyclones not to develop beyond storm strength.

TABLE 4-1. 1974 TROPICAL CYCLONES

CYCLONE	TYPE	NAME	(PRD OF WRNG)	CALENDAR DAYS OF WARNING	MAX SFC WIND+	MIN OBS SLP	TOTAL	WARNINGS ISSUED	
								NO. AS TYPHOONS	DISTANCE TRAVELED
01	TS	WANDA	10 JAN - 13 JAN	4	55	992	15	---	1050
02	TS	AMY	14 MAR - 19 MAR	6	45	987	21	---	1750
03	TS	BABE	26 APR - 02 MAY	7	60	983	26	---	1600
04	TY	CARLA	02 MAY - 07 MAY	6	80	963	22	7	1550
05	TD	---	07 JUN - 08 JUN	2	30	---	5	---	150
06	TY	DINAH	08 JUN - 14 JUN	7	70	974	26	7	1550
07	TS	EMMA	13 JUN - 18 JUN	6	60	988	21	---	1300
08	TS	FREDA	21 JUN - 22 JUN	2	45	989	7	---	800
09	TY	GILDA	30 JUN - 07 JUL	8	90	944	28	18	1400
10	TS	HARRIET	15 JUL - 18 JUL	4	45	996	13	---	900
11	TS	JEAN	17 JUL - 20 JUL	4	45	995	14	---	850
12	TY	IVY	17 JUL - 22 JUL	6	95	945	23	15	1850
13	TS	KIM	23 JUL - 24 JUL	2	50	989	6	---	350
14	TS	LUCY	09 AUG - 11 AUG	3	54	995	10	---	350
15	TY	MARY	*	13	70	964	47	5	3400
16	TD	---	14 AUG - 15 AUG	2	30	994	5	---	250
17	TS	NADINE	15 AUG - 18 AUG	4	50	982	14	---	1600
18	TS	OLIVE	(CENTRAL PACIFIC HURRICANE CENTER)						
19	TY	POLLY	25 AUG - 02 SEP	9	95	948	31	20	1850
20	TD	---	27 AUG - 28 AUG	2	30	994	6	---	300
21	TS	ROSE	28 AUG - 31 AUG	4	50	985	13	---	800
22	TY	SHIRLEY	04 SEP - 09 SEP	6	70	972	21	9	950
23	TS	TRIX	05 SEP - 06 SEP	2	40	---	5	---	250
24	TY	VIRGINIA	12 SEP - 16 SEP	5	75	969	15	9	780
25	TS	WENDY	24 SEP - 30 SEP	7	60	984	24	---	800
26	TY	AGNES	24 SEP - 02 OCT	9	105	961	30	17	2000
27	TY	BESS	08 OCT - 14 OCT	7	65	980	25	10	1950
28	TY	CARMEN	14 OCT - 19 OCT	6	75	974	21	13	1250
29	TY	DELLA	21 OCT - 27 OCT	7	90	958	25	16	1600
30	TY	ELAINE	24 OCT - 31 OCT	8	95	943	29	14	1700
31	TS	FAYE	01 NOV - 04 NOV	4	55	987	13	---	1250
32	TY	GLORIA	03 NOV - 09 NOV	7	120	931	27	15	1850
33	TS	HESTER	14 NOV - 15 NOV	2	35	1000	5	---	350
34	TY	IRMA	21 NOV - 02 DEC	12	115	939	44	19	2250
35	TS	JUDY	18 DEC - 19 DEC	2	40	998	6	---	150
36	TS	KIT	*	5	40	995	14	---	1200
1974 TOTALS				148**			657	194	

\*Mary 11 Aug - 19 Aug and 23 Aug - 26 Aug  
Kit 19 Dec - 21 Dec and 23 Dec - 24 Dec

\*\*Overlapping days included only once in sum  
+Over water estimate (one-minute averaging period)

No super typhoons (maximum sustained winds >130 knots) were observed during 1974, the first year since documentation began in 1959 that no typhoon reached this category. It is suspected, however, that Typhoon Gloria may have approached super typhoon intensity prior to landfall on the Philippine archipelago in early November. This is based on the trend of central pressure fall of the final aircraft fixes, however, lack of additional supporting evidence restricts Gloria from being entered in the super typhoon category.

One of the synoptic features during August and September was the penetration of monsoon westerlies to more poleward latitudes than normal. This situation was caused initially by the extremely large circulation of Typhoon Mary moving to subtropical latitudes. This resulted in an anomalous monsoon trough location extending from coastal South China northeastward to the Ryukyus. Of the four tropical cyclones that developed during this period three (Tropical Depression No. 20, Tropical Storm Rose, and Typhoon Shirley) displayed unusual initial courses compared to climatology by heading northeasterly.

By early October, the monsoon trough became re-established near its normal position in the Philippine Sea, and triggered development of a series of destructive cyclones which crossed the Philippine Islands. This parade of tropical cyclones, led by Bess in October and climaxed by Gloria in early November, subjected the Island of Luzon to the strikes of five typhoons in a period of slightly less than a month. The frequency of these repeated onslaughts to Luzon is unparalleled in climatological records available since World War II.

The Tropical Upper Tropospheric Trough (TUTT) was very active during 1974 producing 19% of the season's named tropical cyclones. Typhoons Polly, Virginia, Agnes and Tropical Storms Freda, Kim, and Wendy developed from disturbances caused by upper lows in the trough. A study of the long term average (Atkinson 1974) indicates approximately 15% of the named tropical cyclones in the western North Pacific can be traced to these disturbances which originate in the trade wind region, and are produced on the south and east periphery of the upper level lows.

TABLE 4-2 FREQUENCY OF TROPICAL STORMS (INCLUDING TYPHOONS) BY MONTHS AND YEARS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1945	0	0	0	1	1	2	5	7	6	1	3	0	26
1946	0	0	1	0	1	2	3	2	3	1	2	0	15
1947	0	0	1	0	1	1	3	3	5	6	6	1	27
1948	1	0	0	0	2	2	2	5	5	4	3	2	26
1949	1	0	0	0	0	1	5	3	6	1	3	2	22
1950	0	0	0	0	1	2	3	2	3	3	3	1	18
1951	0	0	1	2	1	1	1	2	2	4	1	2	17
1952	0	0	0	0	0	3	3	4	5	6	3	4	28
1953	0	1	0	0	1	2	2	6	3	4	3	1	23
1954	0	0	1	0	1	0	1	6	4	3	3	0	19
1955	1	0	1	1	0	1	6	3	3	4	1	1	22
1956	0	0	1	2	0	1	2	5	5	2	3	1	22
1957	2	0	0	1	1	1	1	3	5	4	3	0	21
1958	1	0	0	0	1	3	5	3	3	3	2	1	22
1959	0	1	1	1	0	0	3	6	6	4	2	2	26
AVERAGE (1945-59)	0.4	0.1	0.5	0.5	0.7	1.5	3.0	4.0	4.3	3.3	2.7	1.2	22.3
1960	0	0	0	1	1	3	3	10	3	4	1	1	27
1961	1	1	1	1	3	2	5	4	6	5	1	1	31
1962	0	1	0	1	2	0	6	7	3	5	3	2	30
1963	0	0	0	1	1	3	4	3	5	5	0	3	25
1964	0	0	0	0	2	2	7	9	7	6	6	1	40
1965	2	2	1	1	2	3	5	6	7	2	2	1	34
1966	0	0	0	1	2	1	5	8	7	3	2	1	30
1967	1	0	2	1	1	1	6	8	7	4	3	1	35
1968	0	0	0	1	1	1	3	8	3	6	4	0	27
1969	1	0	1	1	0	0	3	4	3	3	2	1	19
1970	0	1	0	0	0	2	2	6	4	5	4	0	24
1971	1	0	1	3	4	2	8	4	6	4	2	0	35
1972	1	0	0	0	1	3	6	5	4	5	2	3	30
1973	0	0	0	0	0	0	7	5	2	4	3	0	21
1974	1	0	1	1	1	4	4	5	5	4	4	2	32
AVERAGE (1960-70)	0.5	0.3	0.5	0.9	1.4	1.8	4.9	6.1	4.8	4.3	2.6	1.1	29.3

Based on available casualty reports, Typhoons Dinah and Gilda, Tropical Storm Wendy, and Tropical Depression No. 20 accounted for the majority of the tropical cyclone related casualties (Table 4-7). Typhoon Gilda proved the most disastrous of the year. Gilda's circulation triggered flashfloods and landslides in Korea and Japan in early July resulting in a heavy toll of lives (128). Damage estimates of \$1.2 billion in Japan rank it among the most costly to strike that country in recent years. Torrential rains from the extra-tropical stages of Tropical Depression No. 20 produced similar results on the western coast of Korea in late August, accounting for a combined missing and dead total of 77. The worst marine disaster occurred near southern Taiwan as 3,500 ton Panamanian freighter SUN SHANG sank in heavy seas produced by Tropical Storm Wendy (60 knots) with the loss of 31 crewmen.

The northern Philippine Islands experienced a high frequency of typhoons (7) during the year with Dinah's crossing Luzon in June being the most disastrous as casualties totaled 106 persons. The succession of typhoons during October and November crossing Luzon, however, also inflicted heavy damage (\$23 million) to the

rice and sugar cane crops with serious economic impact on the island republic. Reconnaissance of one of these typhoons (Bess) while in the South China Sea, led to the tragic loss of a U.S. Air Force weather reconnaissance aircraft and its crew of six.

Much of the pertinent meteorological data and tropical cyclone damage statistics in this chapter were based on information received from the following sources: Weather Bureau of the Republic of China; Royal Observatory of Hong Kong; Office of the High Commissioner, Trust Territory of the Pacific Islands; Japan Meteorological Agency; National Weather Service of the Republic of the Philippines; and the Environmental Data Service, National Oceanic and Atmospheric Administration, Liverpool Underwriters Association.

<sup>1</sup> The climatology of tropical cyclone activity in the western North Pacific during the last 30 years indicates a significant increase in tropical cyclones since 1960. This is probably due to better observational data, especially satellites, during recent years. Therefore, JTWC considers the last 15-year period as the most representative of the long term average.

TABLE 4-3 FREQUENCY OF TROPICAL STORMS REACHING TYPHOON INTENSITY BY MONTHS AND YEARS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1945	0	0	0	0	0	1	2	5	3	1	1	0	13
1946	0	0	1	0	1	1	3	1	3	1	2	0	13
1947	0	0	0	0	1	1	0	3	4	5	4	1	19
1948	1	0	0	0	2	0	2	2	4	1	2	1	15
1949	1	0	0	0	0	1	3	3	3	1	1	1	14
1950	0	0	0	0	1	1	1	2	1	3	2	1	12
1951	0	0	1	2	1	1	1	2	2	3	1	2	16
1952	0	0	0	0	0	3	1	3	3	4	3	2	19
1953	0	1	0	0	1	1	2	4	2	4	1	1	17
1954	0	0	0	0	1	0	1	4	4	2	3	0	15
1955	1	0	1	1	0	1	5	3	3	2	1	1	19
1956	0	0	1	1	0	0	2	4	5	1	3	1	18
1957	1	0	0	1	1	1	1	2	5	3	3	0	18
1958	1	0	0	0	1	3	4	3	3	3	1	1	20
1959	0	0	0	1	0	0	1	5	3	3	2	2	17
AVERAGE (1945-59)	0.3	0.1	0.3	0.4	0.7	1.0	1.9	3.1	3.2	2.5	2.0	0.9	16.3
1960	0	0	0	1	0	2	2	8	0	4	1	1	19
1961	0	0	1	0	2	1	3	3	5	3	1	1	20
1962	0	0	0	1	2	0	5	7	2	4	3	0	24
1963	0	0	0	1	1	2	3	3	3	4	0	2	19
1964	0	0	0	0	2	2	6	3	5	3	4	1	26
1965	1	0	0	1	2	2	4	3	5	2	1	0	21
1966	0	0	0	1	2	1	3	6	4	2	0	1	20
1967	0	0	1	1	0	1	3	4	4	3	3	0	20
1968	0	0	0	1	1	1	1	4	3	5	4	0	20
1969	1	0	0	1	0	0	2	3	2	3	1	0	13
1970	0	1	0	0	0	1	0	4	2	3	1	0	12
1971	0	0	0	3	1	2	6	3	5	3	1	0	24
1972	1	0	0	0	1	1	4	4	3	4	2	2	22
1973	0	0	0	0	0	0	4	2	2	4	0	0	12
1974	0	0	0	0	1	2	1	2	3	4	2	0	15
AVERAGE (1960-74)	0.2	0.1	0.1	0.7	1.0	1.2	3.1	3.9	3.2	3.4	1.6	0.5	19.1



TABLE 4-4. RATIO OF TROPICAL STORM FREQUENCY DEVELOPMENT TO TYPHOON INTENSITY (1960-1974)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
AVERAGE NUMBER OF TROPICAL STORMS	0.5	0.3	0.5	0.9	1.4	1.8	4.9	6.1	4.8	4.3	2.6	1.1	29.3
AVERAGE NUMBER OF TYPHOONS	0.2	0.1	0.1	0.7	1.0	1.2	3.1	3.9	3.2	3.4	1.6	0.5	19.1
RATIO	.40	.33	.20	.78	.71	.67	.63	.64	.67	.79	.62	.45	.65

TABLE 4-5. SUMMARY OF JTWC WARNINGS 1960-1974

	1960-1974 (AVG)	1970	1971	1972	1973	1974
TOTAL NUMBER OF WARNINGS	704	533	747	739	390	657
CALENDAR DAYS OF WARNING	146	127	163	139	77	148
NUMBER OF WARNING DAYS WITH TWO OR MORE CYCLONES	50	29	54	46	27	38
NUMBER OF WARNING DAYS WITH THREE OR MORE CYCLONES	10	0	6	13	9	4

TABLE 4-6. TYPHOON DAYS 1960 - 1974

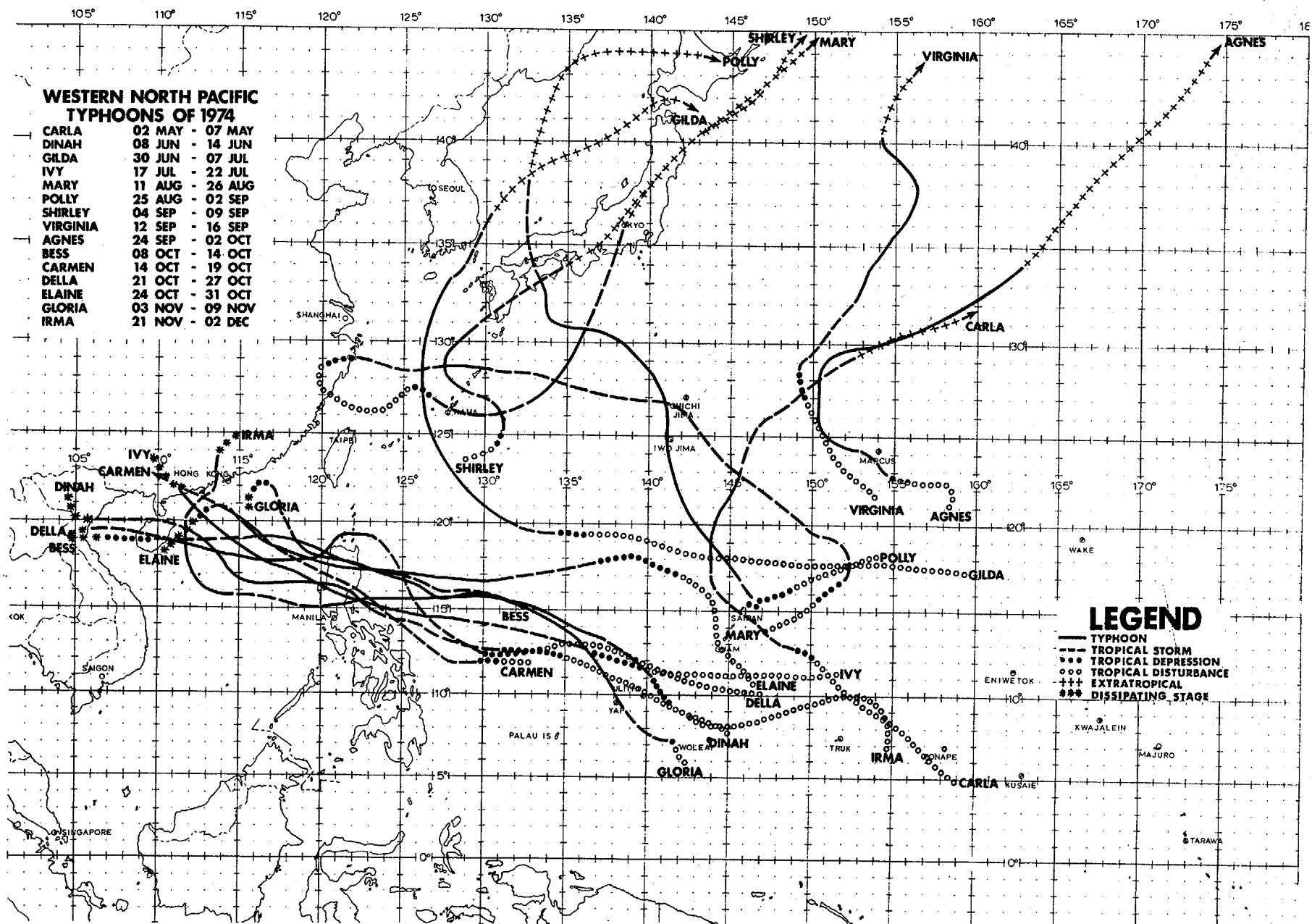
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL PER YEAR
1960	---	---	---	2	---	10	13	36*	---	23*	2*	12	98
1961	---	---	8	---	8	2	10*	15	23*	17*	6	6	95
1962	---	---	---	7	4	---	14*	37*	8	17*	19*	---	119
1963	---	---	---	4	5	15	11	23*	14*	24*	---	11	107
1964	---	---	---	---	7	5*	22*	18*	28*	14	11*	6	111
1965	2	---	---	2	5	12*	19*	23*	25*	14	6	---	108
1966	---	---	---	5	11	6	7*	16*	23*	11	4	3	86
1967	---	---	2	7	---	4	14*	10	32*	21*	21*	---	111
1968	---	---	---	6	1	7	6	8	32*	19	18*	---	97
1969	5	---	---	5	---	---	8	6	10	18	10*	---	62
1970	---	5	---	---	---	2	5	24*	16	21*	6	---	79
1971	---	---	---	4	13*	8	20*	27*	21*	11	7	---	111
1972	2	---	---	---	1	6	39*	16	16*	21	9	11	121
1973	---	---	---	---	---	---	11*	7*	4	20*	---	---	42
1974	---	---	---	---	3	4	10	6	9	16*	13	---	62
TOTAL	9	5	10	42	58	81	209	272	261	280	132	49	1408
MEAN	0.6	0.3	0.7	2.8	3.9	5.4	13.9	18.1	17.4	18.7	8.8	3.3	93.9

\*Two typhoons occurring on the same day are counted as two typhoon days.

TABLE 4-7. LIST OF ESTIMATED CASUALTIES FOR THE 1974 SEASON

TYPE	NAME	DEATHS	MISSING
T	DINAH	75	35
T	GILDA	128	26
T	IVY	20	46
T	MARY	13	0
TD	NO. 20	9	68
T	POLLY	9	8
T	SHIRLEY	13	---
TS	WENDY	47	7
T	BESS	35	3
T	CARMEN	25	---
T	ELAINE	36	21
TS	FAYE	---	2
T	GLORIA	10	---
T	IRMA	11	---
TS	KIT	17	---
TOTAL		434	214

NOTE: Only cyclones for which data are available are listed.

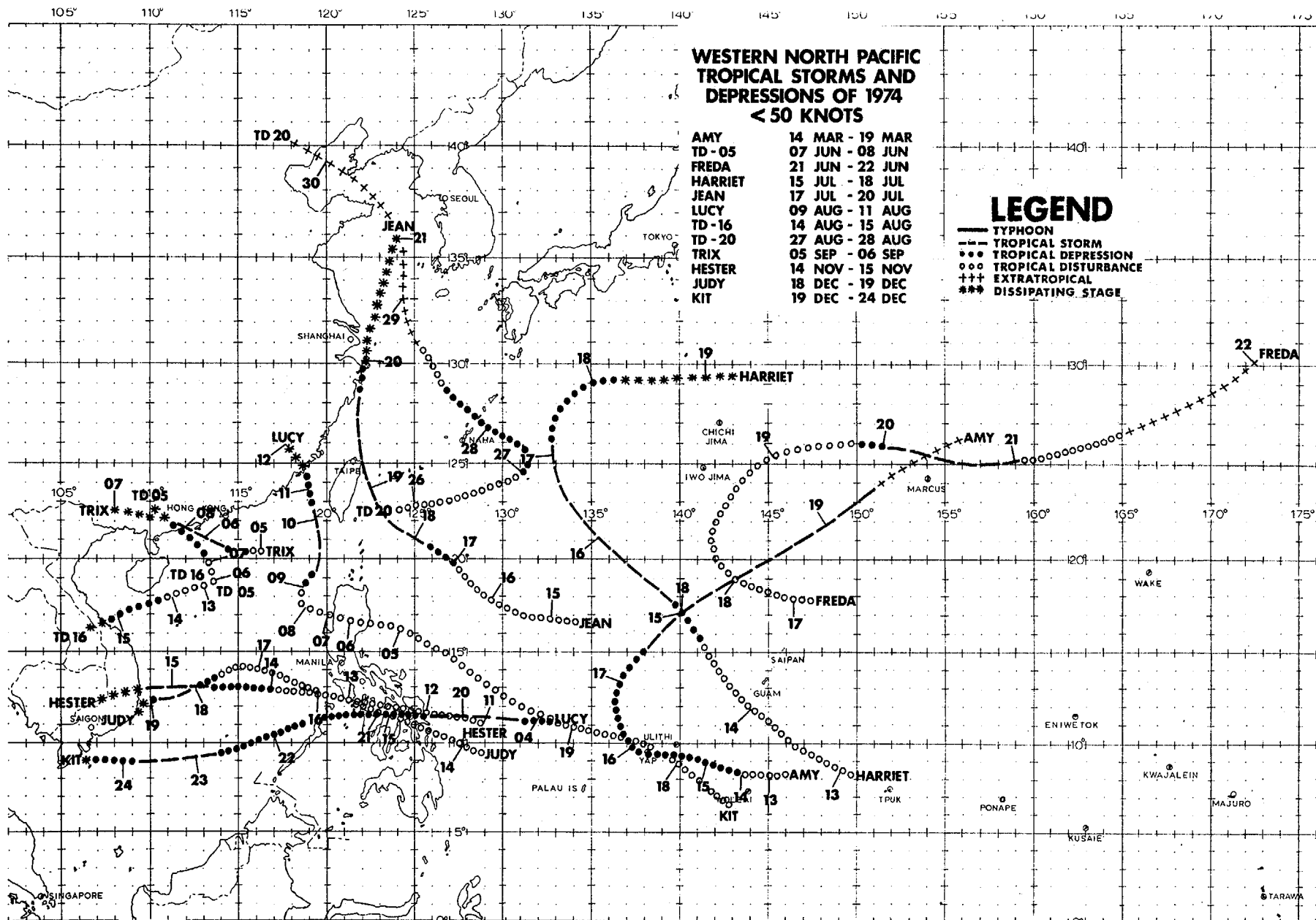


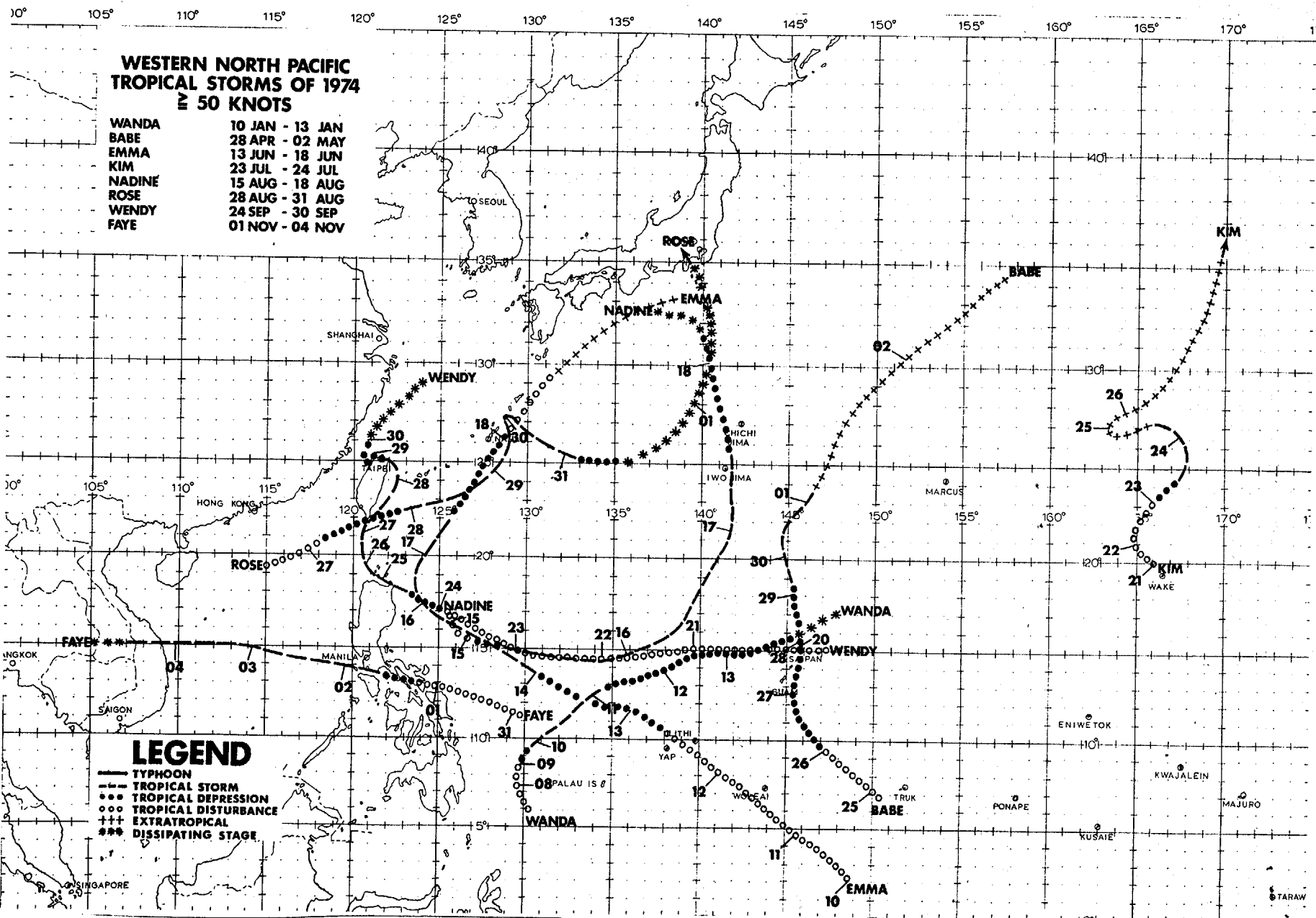
# **WESTERN NORTH PACIFIC TYPHOONS OF 1974**

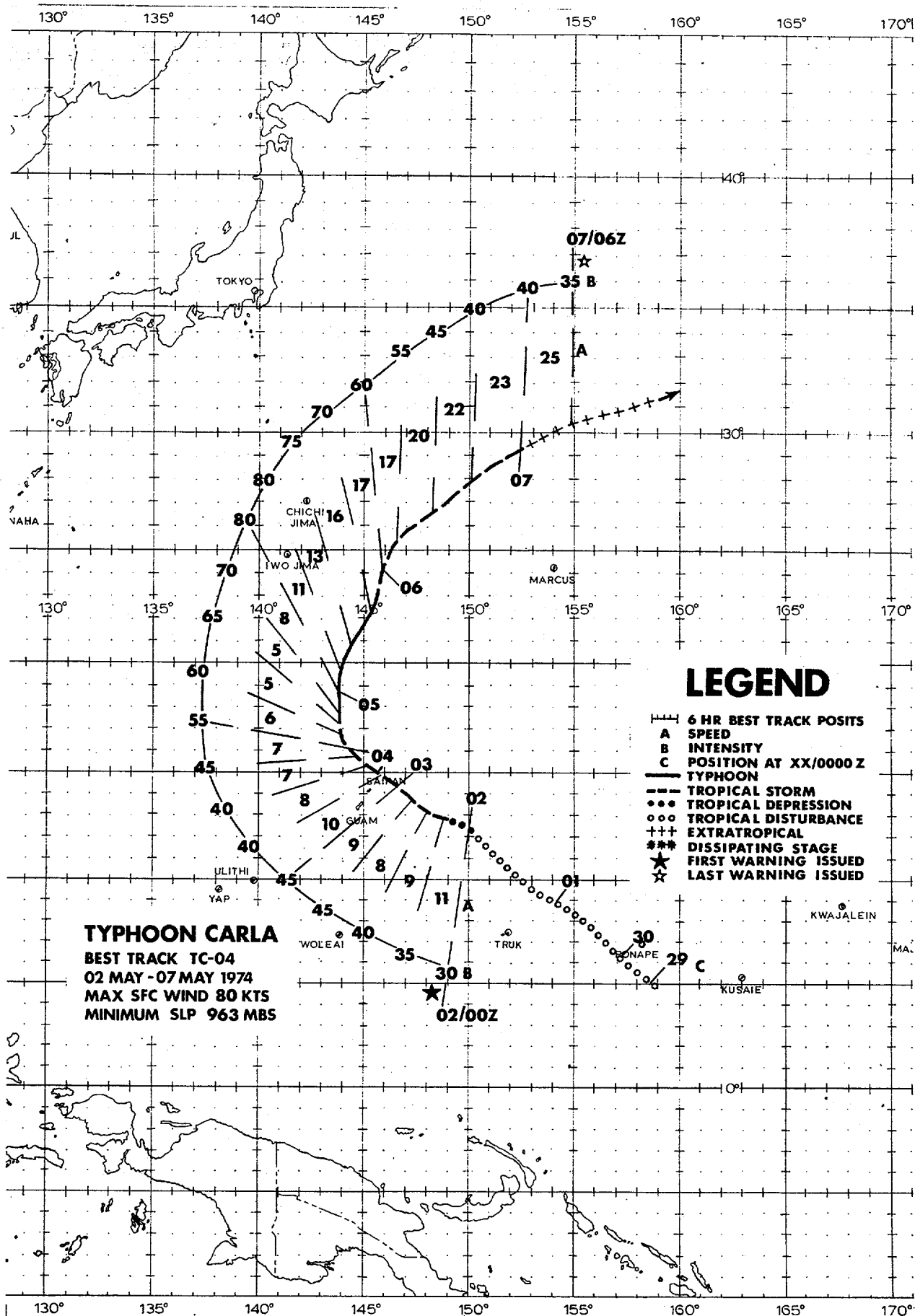
CARLA	02 MAY - 07 MAY
DINAH	08 JUN - 14 JUN
GILDA	30 JUN - 07 JUL
IVY	17 JUL - 22 JUL
MARY	11 AUG - 26 AUG
POLLY	25 AUG - 02 SEP
SHIRLEY	04 SEP - 09 SEP
VIRGINIA	12 SEP - 16 SEP
AGNES	24 SEP - 02 OCT
BESS	08 OCT - 14 OCT
CARMEN	14 OCT - 19 OCT
DELLA	21 OCT - 27 OCT
ELAINE	24 OCT - 31 OCT
GLORIA	03 NOV - 09 NOV
IRMA	21 NOV - 02 DEC

## **LEGEND**

- TYPHOON
- - - TROPICAL STORM
- TROPICAL DEPRESSION
- TROPICAL DISTURBANCE
- +++ EXTRATROPICAL
- \*\*\* DISSIPATING STAGE







## 2. INDIVIDUAL TYPHOONS

### CARLA

In late April, the monsoon trough became active in the central Carolines, producing a tropical depression that later became Tropical Storm Babe. Shortly thereafter, another circulation in the trough near Ponape was noted on 29 April. The system tracked northwestward during the next three days, its development aided by the upper level outflow of Babe tracking north of the Marianas. By 2 May, the circulation located about 225 miles southwest of Saipan, had developed into Tropical Storm Carla (Figure 4-1).

Continuing a northwest track, Carla's center crossed Tinian in the south central Marianas about 0800Z on the 3rd. The U.S. Coast Guard Loran Station on southern Saipan (located a few miles to the north of the center) recorded a peak gust of 57 knots within an hour after passage of the center. The maximum 24-hour rainfall recorded on Saipan during passage was 2.63 inches.

With a mid-tropospheric long wave trough situated between 130 and 135 E, Carla began to turn poleward late on the 3rd. As Carla tracked west of the northern Marianas by some 100 nm on the 4th, aircraft reconnaissance indicated Carla's pressure had fallen to 978 mb and maximum winds around its center neared 65 kts. By 1200Z on the 4th, Carla became the season's first typhoon (Figure 4-2).

The heavy rains and gusty winds brought by Carla to the Marianas took a heavy toll on fruit crops (bananas, citrus, etc.). Rota, Tinian, and Saipan reported 95% damage to crops while Pagan and Agrihan in the northern Marianas reported 45% damage.

Carla continued to deepen on the 5th while tracking northward. Reconnaissance aircraft measurements indicated peak intensity was attained early in the day southwest of the Maug Islands as Carla's central pressure dipped to 963 mb. Maximum sustained surface winds (1 min) were probably close to 80-85 knots near the eye at this time.

Increasing tropospheric shear began to weaken Carla after passage north of the 20th parallel as the cyclone approached the base of the mid-tropospheric westerlies. Twenty-four hours after reaching peak intensity, Carla was reduced to tropical storm intensity, 300 nm east of Iwo Jima.

In advance of a front moving southeastward from Japan, Carla began to accelerate northeastward on the 6th and fill in central pressure. By 1200Z, synoptic and satellite data indicated the remains of Carla had merged with the frontal zone as a weak low near 36N and 158E.

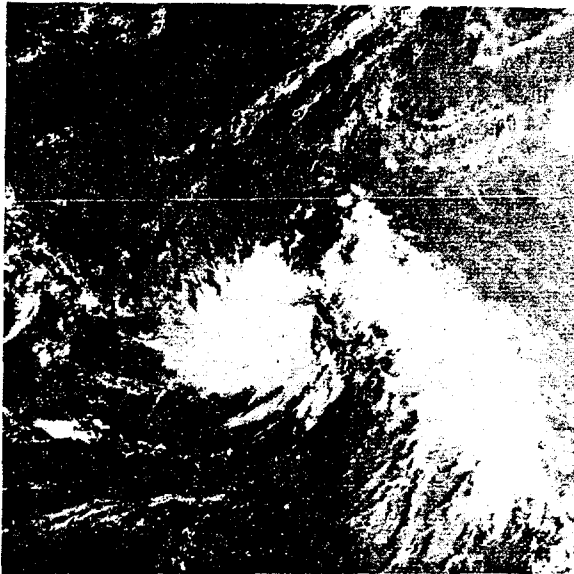
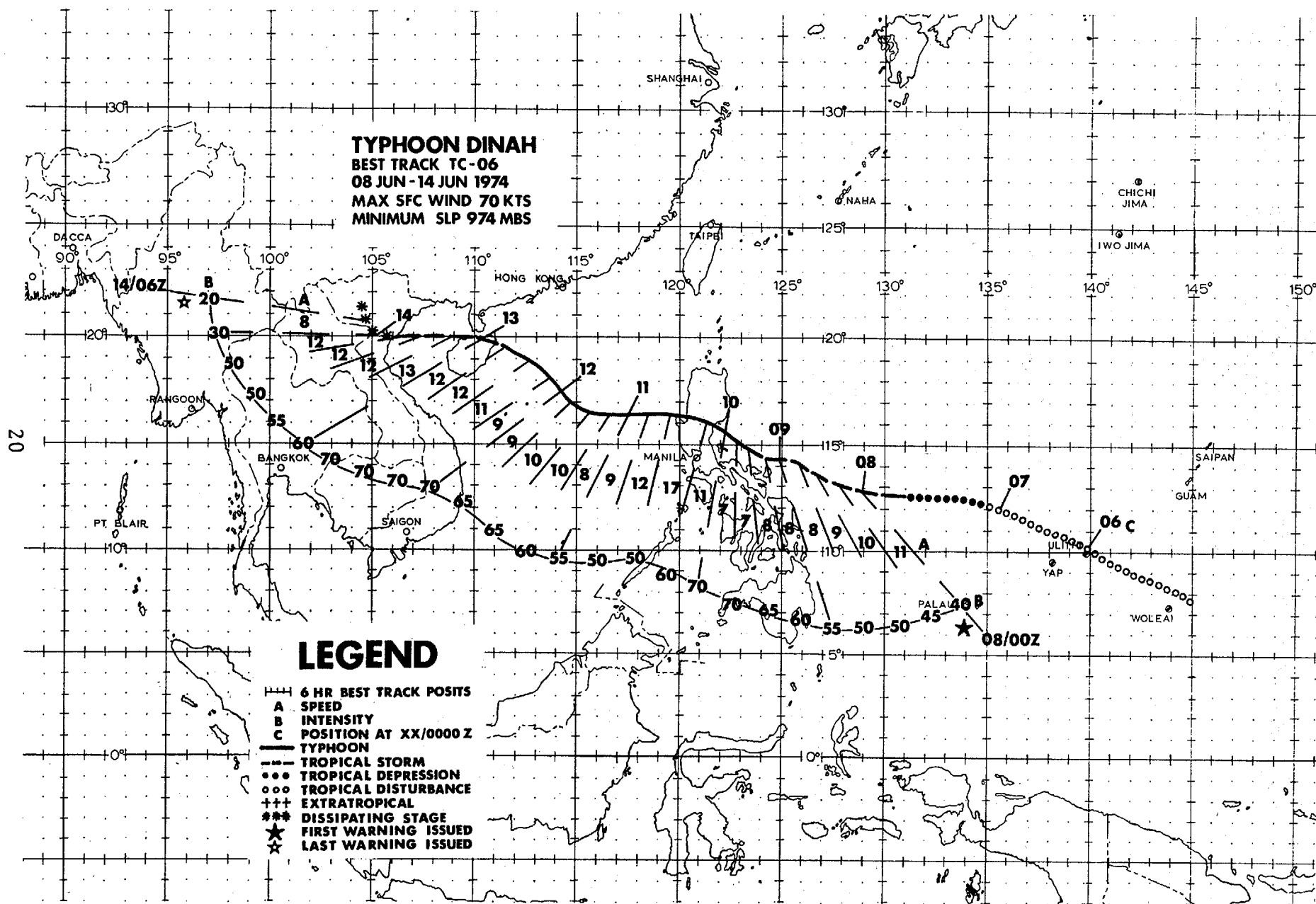


FIGURE 4-1. Carla prior to attaining tropical storm intensity 300nm southeast of Saipan, 1 May 1974, 2236Z. (DMSP imagery)



FIGURE 4-2. Carla achieving typhoon intensity 210nm northwest of Saipan, 5 May 1974, 0255Z. (DMSP imagery)



Dinah's incipient stages can be traced back to a weak circulation in the monsoon trough first noted on synoptic charts on 5 June in the west central Carolines. The system tracked west-northwestward passing just north of Ulithi atoll early on the 6th reaching tropical depression status the next day (Figure 4-3). As a strong subtropical ridge built westward, the depression crossed the Philippine Sea at a rapid pace up to 20 knots. On the 8th, it began to slow in forward speed and intensify about 200 nm east of Samar Island.

Following somewhat of a meandering course Dinah passed just north of Catanduanes Island on the 9th and veered temporarily to a northwest track in response to a short wave trough over the East China Sea. Aircraft reconnaissance indicated that Dinah had developed typhoon force winds in its northern semicircle during this period. An aircraft measurement shortly before landfall indicated a central pressure of 974 mb (10/0235Z) the lowest observed during the cyclone's lifetime. At landfall, the coastal town of Baler (15 nm south of the center) reported a minimum pressure of 979.8 mb and gusts to 46 knots while Casiguran 35 nm north of the center measured a gust to 47 knots (Figure 4-4).

Dinah cut across Luzon's mountainous terrain in less than 6 hours emerging north of the Lingayen Gulf near the town of San Fernando. Torrential rains (24 hour totals up to 19.4 inches at Virac and 15.4 inches at Baler) set off flash flooding and landslides in the island Republic claiming a toll of 73 dead and 33 missing. Estimates of damage caused by Dinah were approximately \$1 million.

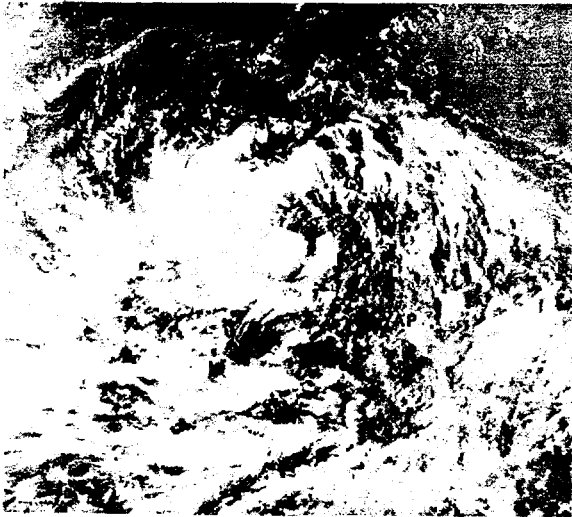


FIGURE 4-3. Formative stages of Dinah centered 200nm northwest of Yap, 6 June 1974, 2330Z. [DMSP imagery]

Dinah assumed a westerly course after exiting Luzon regaining typhoon strength by midday on the 11th. Aircraft reconnaissance reported a central pressure of 978 mb (11/0855Z) within a broad center estimated to be 50 nm in diameter. The Japanese ship MATSUSHIMA MARU passed about 40 nm east of the center a few hours later (11/1200Z) reporting a minimum pressure of 980.8 mbs. Dinah's central pressure varied little thereafter, and its center remained broad until landfall on Hainan Island.

As a high pressure region over South China advanced into the East China Sea, Dinah shifted course for the Luichow peninsula on the 12th. Rebuilding pressures, however, blocked Dinah from crossing the South China coast. Following transit of northern Hainan Island, Dinah weakened to tropical storm strength and entered North Vietnam south of Haiphong quickly dissipating once inland.

While in the South China Sea, Dinah's circulation was extensive; radius of the area within the 1000 mb isobar was about 360 nm by the 11th. On this day, Pratas Island 150 nm north of the center reported sustained winds (10 min) of 30 knots (11/1200Z), and the Japanese ship NISSHO MARU 125 nm east of the center reported estimated winds of 45 knots. By the 12th, an unidentified ship caught 60 nm north of the center reported estimated winds of 45 knots (12/0000Z). Later that day, the Chinese meteorological station on the Paracel Islands 120 nm south of the center recorded sustained winds (10 min) of 45 knots. Strong gusty winds were also felt in Hong Kong on the 12th as the eye of Dinah passed some 250 to 200 nm south and southwest. Wagland Island in the Colony reported gusts up to 60 knots and the Royal Observatory gusts to 64 knots.

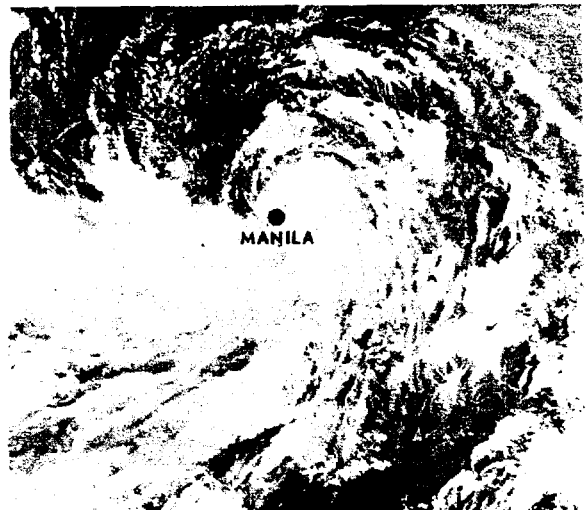
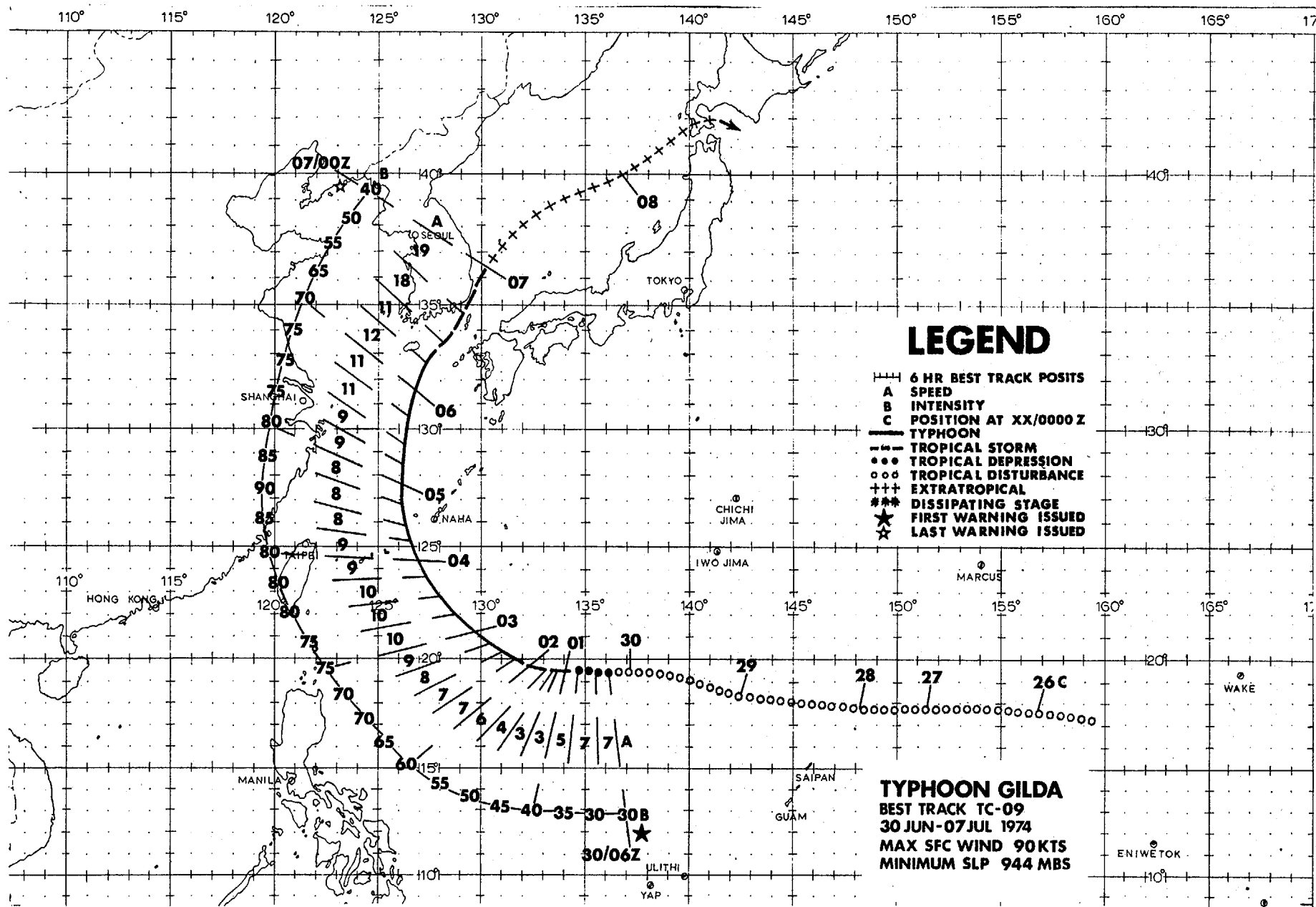


FIGURE 4-4. Typhoon Dinah a few hours from landfall on Luzon island near Baler, 10 June 1974, 0017Z. [DMSP imagery]





The third typhoon of the season, Gilda, developed to typhoon strength 450 nm south-east of Okinawa on 2 July. Initial detection of the system was on 25 June about 400 nm north of Eniwetok as a weak circulation on the trailing edge of a surface trough which extended northeastward to the vicinity of Midway Island. The system tracked westward for five days displaying little marked development based on satellite data coverage. By the 29th, however, signs of increased organization became evident and, late the following day, Gilda's circulation had generated surface winds of tropical storm intensity.

Gilda began to move poleward on the 2nd and develop winds of typhoon strength as a stationary mid-tropospheric trough dominated eastern China. Early that day, the Japanese vessel SHINKYOKU MARU crossed southward just ahead of Gilda's path observing northwesterly winds of 45 knots and a pressure of 988.0 mb (02/0600Z).

The typhoon reached its peak intensity during the two-day period it approached the Ryukyu chain (Figure 4-5). Reconnaissance aircraft measured a 944 mb central pressure (04/1431Z) when the eye passed 70 nm southwest of Naha, Okinawa on the 4th. A peak gust of 85 knots was measured at the Naha Observatory (04/0840Z) during passage, while on Kume Jima a gust of 101 knots was registered several hours later (04/1550Z) when Gilda's eye passed 30 nm to the west.

Heavy rain and gusty winds from Gilda were responsible for almost a complete failure in Okinawa's electric power. Heavy rains (up to 10.8 inches at Naha) also accounted for numerous landslides and local

flooding. One person was reported killed and several fishing vessels sunk. Crops including sugarcane, bananas, and vegetables suffered extensive damage.

As the typhoon entered the East China Sea, it tracked northward around the western periphery of the mid-tropospheric subtropical ridge. Diminishing in intensity while approaching Cheju Do Island early on the 6th (Figure 4-6), Gilda responded to increasing upper level southwesterly flow over Manchuria, and began to accelerate. By the 7th, Gilda's circulation was in the Sea of Japan as an extratropical system heading toward southern Hokkaido.

Gilda brought torrential rains to Korea during passage near the southeast coast with total rainfall amounts exceeding 10 inches near coastal areas. The highest amount of 10.8 inches was measured at Kwangyang. The heavy rains caused flash flooding and landslides which completely or partially destroyed over 700 dwellings and left over 6000 homeless. Total damage loss was estimated at \$2.8 million, with casualties of 21 dead and 11 missing.

Meanwhile, Gilda's circulation activated a stationary front over western and central Japan producing torrential rains over a widespread area. The coastal town of Owase on the Kii peninsula reported an extreme 24 hour total of 16.5 inches. Newspaper reports indicated Gilda caused an estimated \$1.2 billion in property damage, including tens of thousands of flooded homes, damaged roads, and washed out railway lines and bridges. The toll in Japan from landslides and flash flooding accounted for 106 dead and 15 missing.

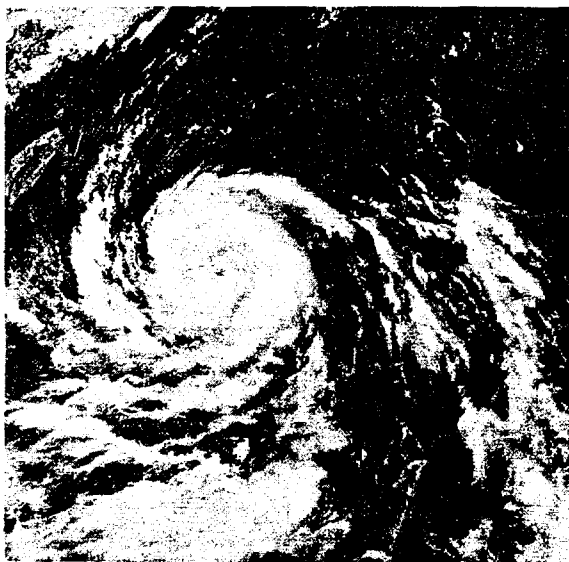


FIGURE 4-5. Typhoon Gilda near peak intensity 100nm southwest of Naha, Okinawa, 3 July 1974, 0227Z. (DMSP imagery)

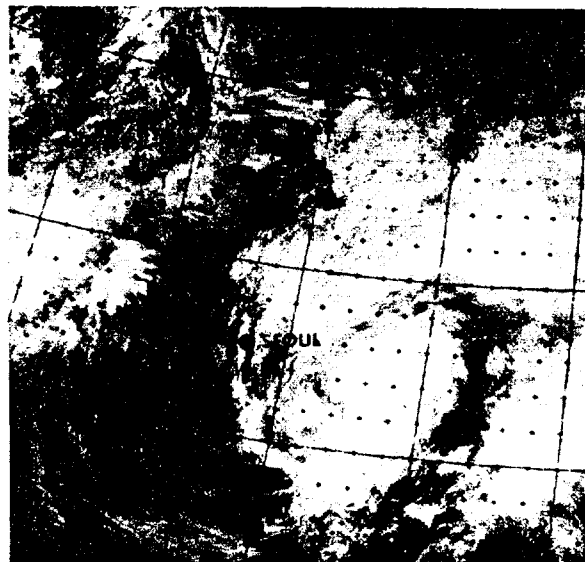
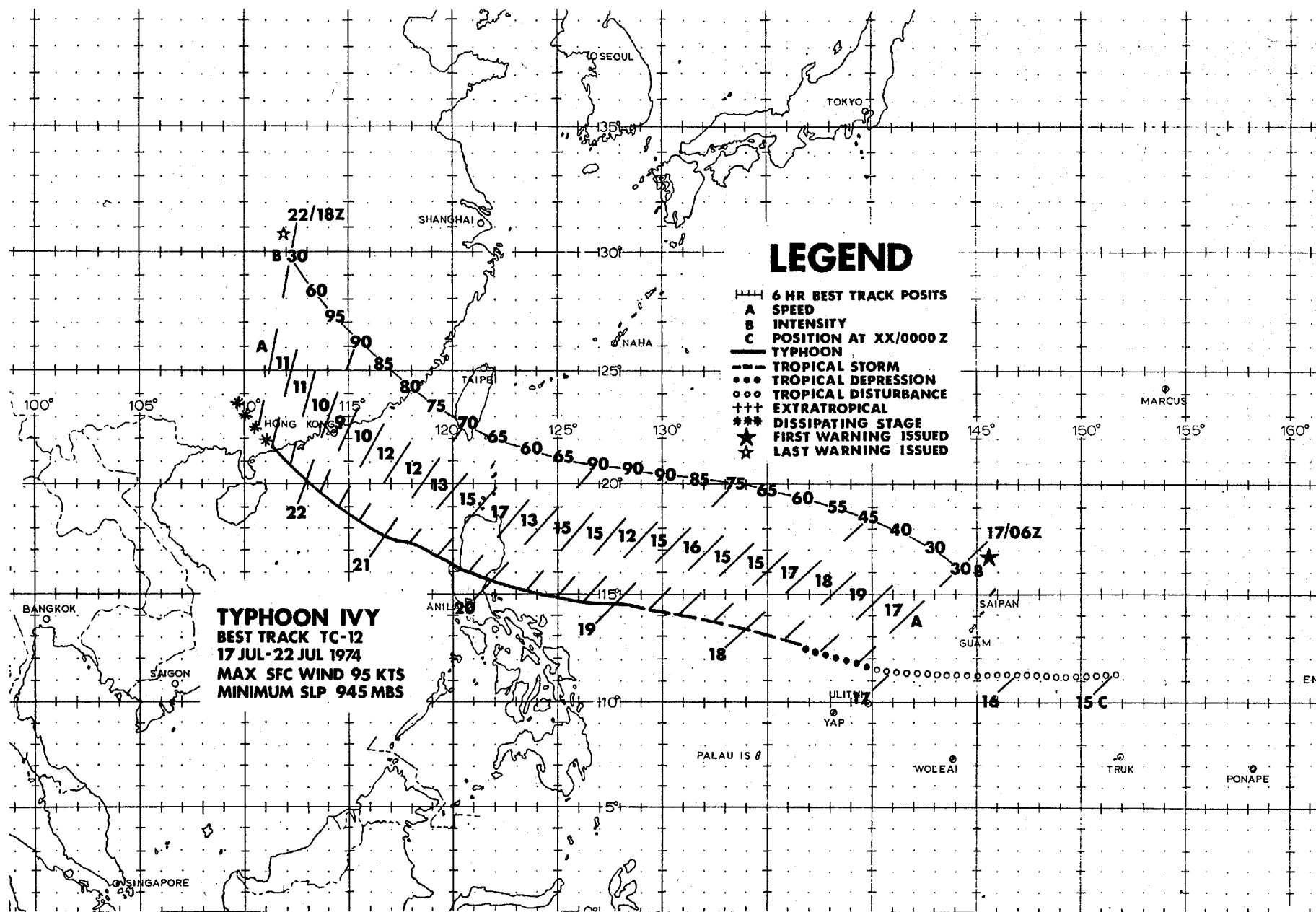


FIGURE 4-6. Typhoon Gilda acquiring extratropical characteristics in the Sea of Japan 180nm southeast of Seoul, Korea 7 July 1974, 0254Z. (DMSP imagery)



The 0000Z synoptic chart for 17 July depicted multiple tropical cyclones over the Philippine Sea. Harriet was weakening to depression status east of Okinawa as Jean developed storm force winds east of the Luzon Straits. Meanwhile, evidence of a strengthening depression was noted in the monsoon trough 250 nm west-southwest of Guam. The last system, destined to become Ivy, intensified to tropical storm force the following day (18th) (Figure 4-7). Within two days, Ivy struck Luzon as a well developed typhoon.

Ivy's track across the Philippine Sea was affected by a strong subtropical ridge resulting in movement speeds of 15-18 knots. Once Tropical Storm Jean crossed into the East China Sea, the subtropical ridge built westward and prevented Typhoon Ivy from taking a climatological northwesterly track. Instead, the typhoon was forced to maintain a westward course near the 15th parallel. The typhoon began to deepen rapidly on the 18th. Its central pressure dropped 32 mb in 20 hours, reaching a minimum of 945 mb (19/1037Z) about 15 hours prior to landfall. Filling slightly, Ivy struck the Luzon coast south of Baler with sustained winds of 90 knots early on the 20th. A peak gust of 97 knots from the east and a minimum pressure of 973 mb was reported at the Baler meteorological station during eye passage.

The severity of turbulence associated with Ivy prior to landfall on Luzon was readily attested to by an aircraft reconnaissance crew late on the 19th. During penetration of the wall cloud, turbulence was sufficient to flame out one of the WC-130's four engines. Fortunately, engine restart was accomplished by the crew while orbiting in the eye.

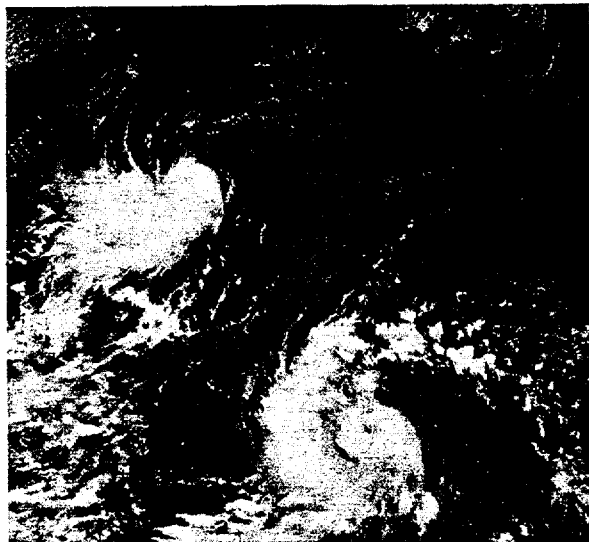


FIGURE 4-7. Tropical Storm Ivy about 450 nm east of Samar Island. Tropical Storm Jean is seen approaching Taiwan, 18 July 1974, 0253Z. (DMSP imagery)

After crossing central Luzon, Ivy emerged into the South China Sea from the Lingayen Gulf quickly regaining typhoon strength lost during transit over the mountainous terrain. In response to a mid-tropospheric trough positioned just east of the Tibetan Plateau, Ivy began to take a more northward course gradually slowing in forward speed and reintensifying as it approached South China (Figure 4-8). Estimates based on satellite data indicated that prior to landfall (just east of the Luichow peninsula on the 22nd) maximum sustained winds near the center were probably in the 85-95 knot range.

The circulation of Ivy caused gale force gusts at Hong Kong as she passed 150 nm south of the Colony. Peak gusts of 63 knots and 55 knots were recorded on the exposed islands of Cheung Chau and Waglan Island, respectively. Maximum 24-hour rainfall was relatively light at the Royal Observatory with only 1.4 inches recorded on the 22nd. Ivy's circulation quickly lost identity after moving inland midway through the 22nd and the system disappeared from the surface analysis 24 hours later.

In the Philippines, the typhoon's casualty aftermath mounted to 66 persons with 46 of these listed as missing. Hardest hit by Ivy was Baler, a town of 15,000, in which newspaper reports indicated 50% of the houses were leveled. Also in the Polillo Island group in Lamon Bay, 42 fishermen were reported lost following Ivy's passage. Estimates of dollar damage to structures, crops, and livestock in Luzon were placed at \$2 million.

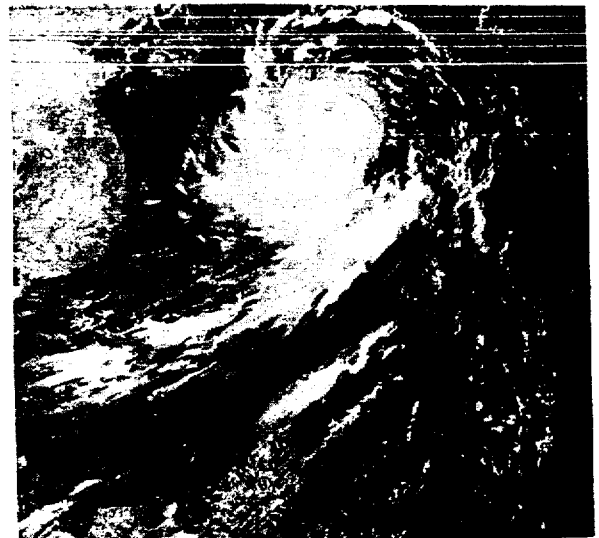


FIGURE 4-8. Typhoon Ivy in the South China Sea 250 nm south of Hong Kong, 21 July 1974, 0339Z. (DMSP imagery)



SS-1043

From its early stages east of the Marianas, to final dissipation over Japan, Mary's behavior was atypical of a tropical cyclone. Mary's circulation during the early stages was marked by maximum wind bands removed from the center by several hundred miles. In addition, the storm's circulation reached enormous proportions, dominating the weather events over the entire Philippine Sea for several days. The longest lived tropical cyclone of the season, Mary persisted for 15 days with 2 1/2 of these days spent inland from the East China coast. Toward the end of its lifetime, Mary culminated its unusual behavior by defying climatology, leaving the East China coast on an easterly heading, and regenerating to typhoon strength.

First identified as a weak circulation on synoptic surface charts on 9 August, Mary developed to depression status by the 11th in the monsoon trough some 250 nm east of Saipan. It is significant that during this period surface pressure falls to 5 mb below normal were occurring along the trough across the Philippine Sea. As a result, the monsoon westerlies began to intensify producing a narrow belt of winds averaging 25-30 knots feeding into the depression. By the 11th, satellite data revealed a band of cloudiness extending from the Philippine archipelago to the eastern Carolines in response to the strengthening monsoon flow (Figure 4-9).

Initially moving northeastward, Mary's circulation began to generate winds of tropical storm force late on the 11th. Thereafter, the storm shifted to a northwest course abruptly accelerating in forward speed to 14 knots on the 13th. Mary's circulation was characterized during this period by the existence of maximum wind bands far removed from the low pressure center. Reconnaissance aircraft reports on the 11th and 12th indicated that the center was becoming increasingly separated from the associated convective cloudiness. By the 13th, the center was 200 nm from the nearest convective band. The dimensions of the anomalous structure was readily apparent in satellite views on the 14th (Figure 4-10). By this time a band of convective cloudiness spiraling around the center in a broad arc was evident--a pattern quite similar to an extratropical low.

As Mary's center took a poleward component on the 12th and 13th, the associated convective band leading into the circulation, and trailing some 500 nm south and southwest of the center, drifted over Guam. Winds gusting to gale force occurred over a period of 3 days starting early on the 11th. Peak gusts from the southwest reached 57 knots on the 12th (0950Z) and the 13th (2012Z) at Andersen AFB. Rainfall amounts of 7.25 inches in 24 hours were recorded at Andersen AFB between the 11th and 12th as the island lay beneath Mary's outer convective band. This extreme 24-hour rainfall amount exceeds all records for August on Guam.

The persistent strong southwesterly winds were responsible for significant damage to marine interests on Guam. The CARIBIA, a 40,000 ton passenger liner, being towed to Taiwan for salvage, broke loose from her tug at the entrance to Apra Harbor, ran aground on the breakwater, and later sank. An estimated \$3.3 million loss was associated with the sinking of this vessel. The heavy seas also took their toll on small craft (which are normally protected on the leeward side of the island in the trades) as many broke their moorings and went aground. One yacht valued at \$250,000 was included among the lost vessels. Two lives were lost due to drowning and damage estimates amounted to over \$542,000 in the Territory.

On Rota, Tinian, and Saipan crops were especially hard hit by the strong winds and torrential rains. On Tinian, the vessel MV MARIANAS broke from its moorings and went aground. In the northern Marianas, major damage was sustained mostly to copra and banana trees.

As Mary neared the Volcano Islands, the area of surface pressure of 1000 mb or less was exceedingly large--stretching at its greatest diameter some 1200 nm in a north-northeast/south-southwest orientation and 850 nm in an east-west direction. The unusually low pressures in the trough trailing Mary southwestward into the Philippine Sea caused development of a tropical depression some 350 nm north-northwest of Yap. Moving eastward in Mary's circulation, the depression apparently interacted with the tropical storm midday of the 14th when it approached within 700 nm of Mary's center, Mary's forward motion began to slow and the storm abruptly shifted to a westerly course early on the 15th. Meanwhile the strong tropical depression accelerated in forward speed around Mary's southeastern side and dissipated due to the excessive vertical shear.

Late on the 14th the center of Mary's broad eye crossed 35 nm south of Chichi Jima. The island's meteorological station reported a minimum pressure of 977.1 mb (14/2240Z)--only slightly higher than an aircraft reconnaissance central pressure observation a few hours later (972 mb at 15/0217Z).

On the 15th, a second depression was spawned 300 nm east of Luzon in the low pressure envelope trailing Mary. Accelerating eastward in Mary's circulation, Nadine developed to tropical storm force late on that day. Once Nadine was within 700 nm of Mary's center late on the 15th a second interaction occurred, resulting in Mary's continued westward movement (Figure 4-11).

A long wave mid-tropospheric trough west of Lake Baykal began to deepen on the 16th resulting in a rapid building of a ridge downstream over Manchuria with a high pressure cell centered near Port Arthur. This abnormally strong high blocked any further poleward movement and caused Mary to maintain an anomalous westward course until landfall

on the East China coast on the 19th.

During this westward movement, satellite data indicated that Mary developed a more tropical appearance as a canopy of cloudiness covered the cyclone's center. Mary intensified slightly, and for a short period on the 18th winds reached typhoon force as the storm cut through the Ryukyu chain (Figure 4-12). Naze city on Amami-O-Shima reported the lowest pressure (979.6 mb at 18/0240Z) as Mary's center tracked 20 nm to the north. The highest winds in the Ryukyus were measured at Yakushima Island which recorded a peak gust of 90 knots at 18/0040Z. As the typhoon's precipitation swept over southern Kyushu, heavy rainfall amounts varying between 8 and 11 inches were reported in the mountainous areas. Miyakonjo on Kyushu measured the greatest 24 hour total of 6.4 inches during the 18th.

Moving inland on the China coast about 100 nm south of Shanghai late on the 19th, Mary was blocked from moving into the mountainous interior by a high cell over central China. As a result, Mary stalled just inland as a deep depression for several days. Meanwhile, the mid-tropospheric ridge over Manchuria began to break down rapidly as a developing mid-tropospheric trough east of Lake Baykal begin to deepen equatorwards.

By the 22nd, the increasing westerly flow west of and over the Gulf of Chihli forced the depression back out over the open waters of the East China Sea.

Regenerating to minimum storm strength on the 23rd, Mary passed over Okinawa as a "back door" storm early on the 24th increasing in forward speed to 13 knots during crossing. The meteorological station at Kadena Air Base registered a minimum pressure of 981 mb (24/0105Z) and a peak gust from the northwest at 41 knots. Center passage was estimated 18 nm to the north of Kadena. At the Naha Observatory a peak gust of 58 knots (24/0330Z) was recorded. Later in the day, Mary passed just north of Minami Daito Jima as the storm achieved typhoon intensity. The

Japanese weather station on the island experienced a peak gust of 90 knots (24/1707Z) and a minimum pressure of 969.3 mb (24/1704Z).

The development of a low within a mid-tropospheric trough over Korea began to draw Mary on a northward course late on the 24th. Due to the tightening gradient over Japan created by this deepening trough and a subtropical ridge cell positioned east of Honshu, Mary accelerated north-northeastward reaching a forward speed of 26 knots prior to striking Honshu near Hamamatsu on the 26th.

Mary briefly maintained typhoon status on the 25th, although the cyclone's winds dropped to storm strength prior to landfall on Honshu. Further evidence of Mary's rejuvenation came from aircraft reconnaissance late on the 24th observing a 15 mb drop in 24 hrs to 964 mb (24/2141Z). Several hours later the British vessel W. C. VAN HORNE was caught near the eye of the typhoon while crossing 30 nm east of the center. Winds of 70 knots from the south and a pressure of 981.8 mb were reported from this vessel at 25/0600Z. Crossing the Japanese coastline near Hamamatsu, the meteorological station indicated Mary's central pressure had risen to 986.2 mb (26/0030Z). Thirty minutes prior to center passage a peak gust of 63 knots was recorded at the station. Elsewhere along the coast, Omaezaki reported a southerly gust of 69 knots (26/0050Z).

Merging with a frontal system over Japan, Mary became extratropical moving inland over Honshu early on the 26th. Heavy rains spread over the north central region of the island with the greatest 24 hour amount of 8.98 inches occurring at Nikko. On the southern coast, Shizuoka City recorded a 24 hour total of 6 inches.

Only one casualty occurred in the Japanese islands as a result of Mary; however, strong winds associated with Mary over the Sea of Japan were responsible for capsizing a fishing trawler off Cape Amasaki. Of a crew of eleven, only one was rescued.

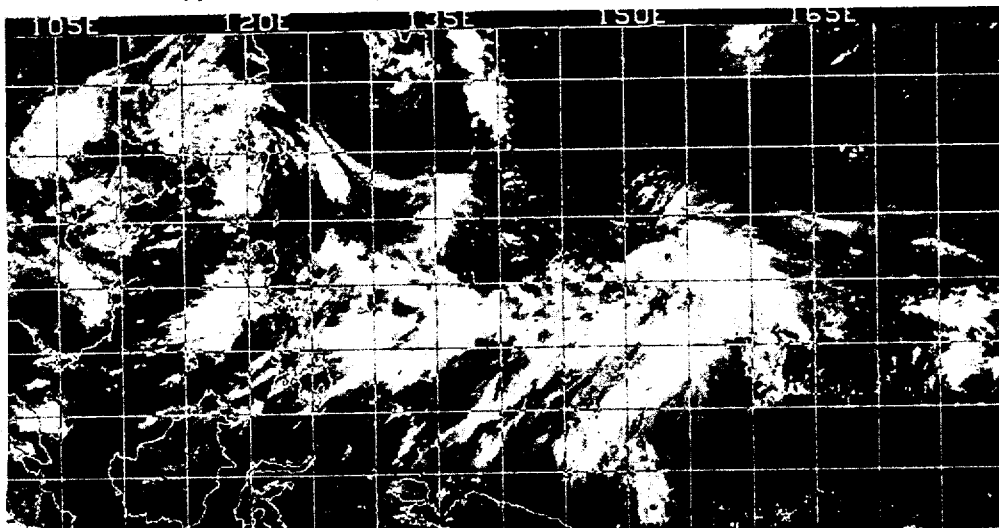


FIGURE 4-9. NOAA-2 satellite mosaic for 11 August 1974 showing cloud band associated with southwest monsoon extending from the Philippines to Mary developing east of the Marianas.



FIGURE 4-10. Tropical Storm Mary appearing as an extratropical system centered 220 nm southeast of Iwo Jima, 14 August 1974, 0118Z. (DMSP imagery)

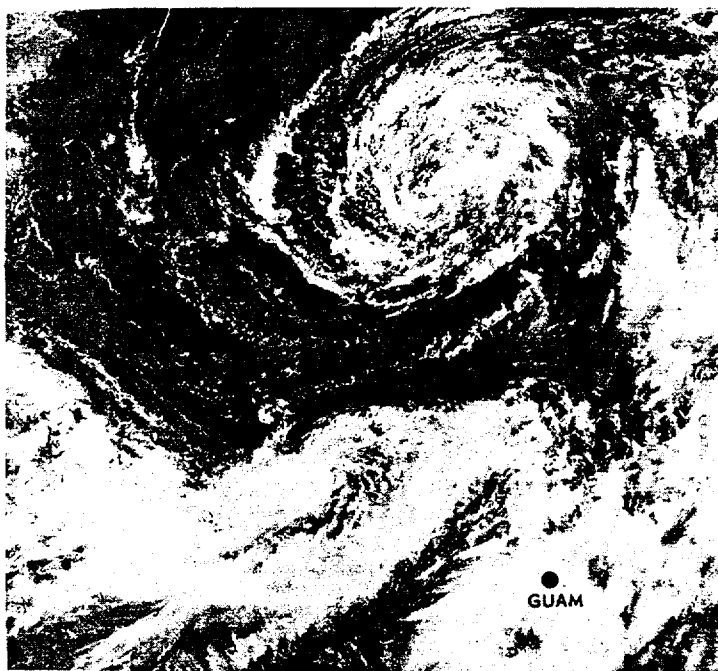


FIGURE 4-11. Tropical Storm Mary (top) centered 550 nm south of Tokyo. Tropical Storm Nadine (bottom) 700 nm further south in the Philippine Sea is centered 400 nm north of Yap Island, 16 August 1974, 0223Z. (DMSP imagery)

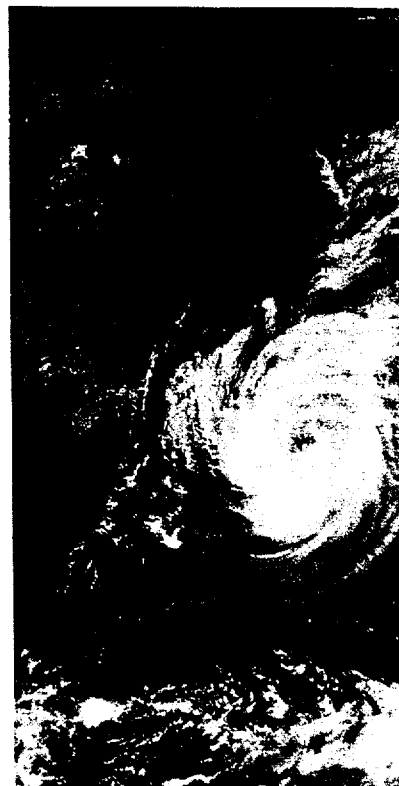
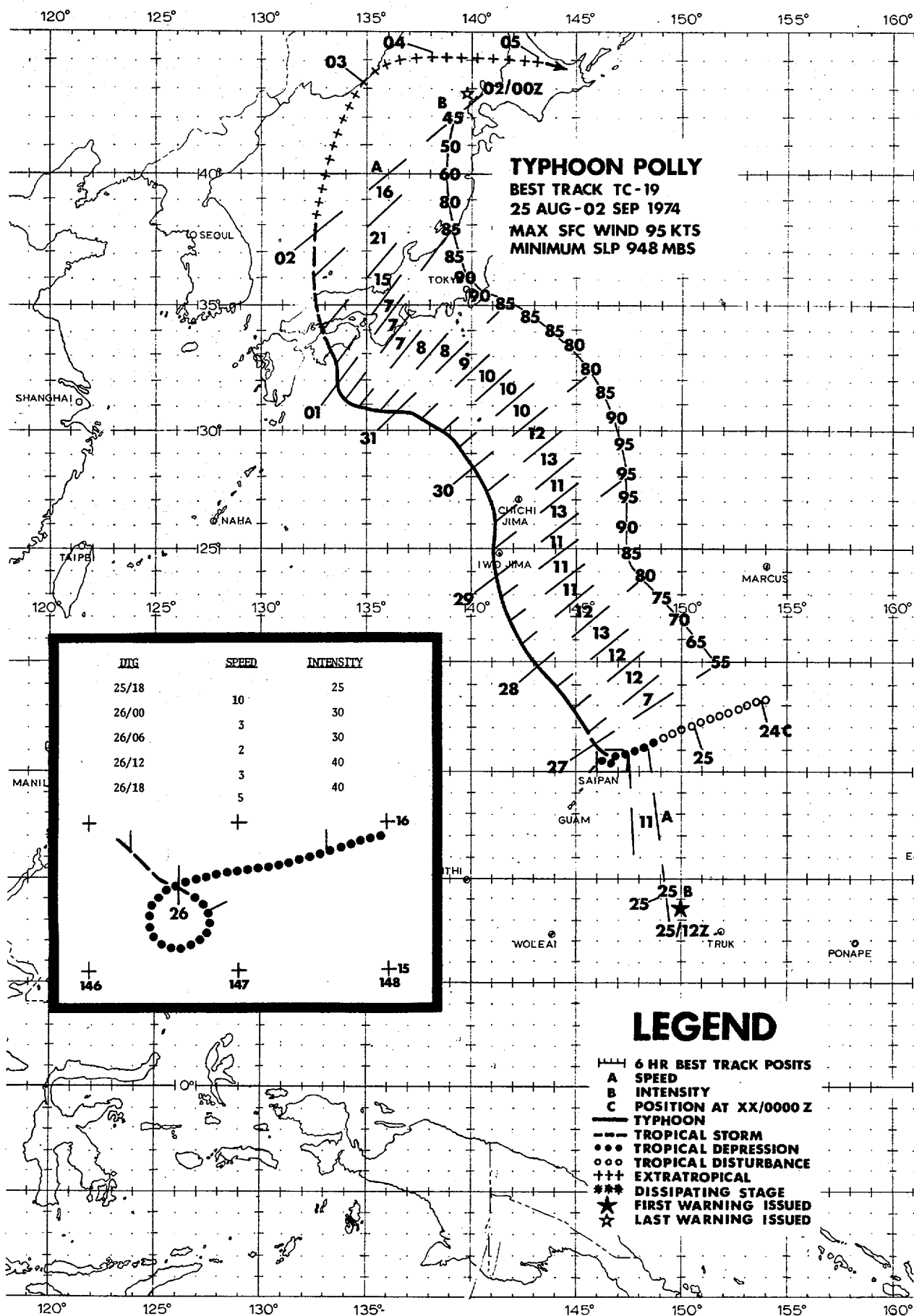


FIGURE 4-12. Mary after reaching typhoon force centered 100 nm north of Naha, Okinawa, 18 August 1974, 0327Z. (DMSP imagery)





## POLLY

While Mary was accelerating toward central Honshu, satellite data revealed another disturbance, induced from an upper level low, was showing signs of development 400 nm east of the northern Marianas. Midday on the 26th, the circulation system intensified into Tropical Storm Polly about 40 nm northeast of Saipan. Development was rapid thereafter, as the storm's central pressure dropped 25 mbs in a period of a day after an aircraft reconnaissance reading of 989 mb late on 26th (2056Z).

Polly's movement in the central Marianas was erratic as the storm was impeded by a high pressure cell located to the southwest near Yap. By the 27th, however, the flow about a strong high east of Japan dominated, and Polly departed the "col" region between the two anticyclones increasing in forward speed to 12 knots.

Veering northward late on the 28th, the typhoon took aim on the Volcano Islands. Polly's central pressure continued to fall terminating at a minimum value of 948 mb 170 nm south of Iwo Jima. Twelve hours later the typhoon passed abeam of Iwo Jima and later on the 29th passed about 70 nm west of Chichi Jima. Iwo Jima reported peak gusts of 108 knots from the south (29/0705Z) after the eastern edge of Polly's 20 nm diameter eye passed the island. A minimum pressure of 951.5 mb was registered while in the eye. Later, Chichi Jima recorded a peak gust of 88 knots from the east-northeast (29/1240Z) and a minimum pressure of 989.8 mb (29/1900Z) during passage.

During Polly's advancement northward from the Marianas, Tropical Storm Rose generated east of Taiwan. Late on the 29th, Rose had moved to a position just north of Okinawa, and become quasistationary. The proximity of Tropical Storm Rose 700 nm west of Polly and a blocking high north and northeast of Polly resulted in the beginning of a Fujiwara interaction on the 30th. Polly began to turn northwest to westward during the next day and a half, as Rose sped around the south side of Polly's circulation (Figure 4-13).

With a long wave trough over eastern China, and Rose weakening significantly on Polly's eastern periphery, the typhoon veered abruptly on a northward track late on the 31st. Increasing in forward speed to 15 knots, Polly's center struck the Japanese islands of Shikoku and southwestern Honshu, emerging six hours later in the Sea of Japan late on the 1st. Diminishing to tropical storm force in the Sea of Japan, Polly continued a poleward movement crossing the Russian coast east of Vladivostak as an extratropical low on the 2nd.

As Polly's eye moved ashore on Shikoku, the Kochi City meteorological station 20 nm east of center, measured a minimum pressure of 976.3 mb (01/0920Z), and a peak gust from the east at 78 knots (01/0930Z). The Ashizuri station (20 nm west of the center), however, reported the lowest pressure on the coast--966.5 mb (01/0740Z). Murotomisaki

(elev. 745 ft, 70 nm northeast of the center) reported the highest gust--95 knots from the east (01/0310Z)--several hours before Polly's landfall. Maximum 24-hour rainfall measured on Shikoku Island due to Polly was 11.8 inches at the coastal station of Ashizuri.

During the typhoon's passage across Japan, Polly's circulation intensified a stationary front over east central Honshu bringing excessively heavy rains to the mountainous area west of the Kanto plain. Oguchi, Tokyo prefecture reported a total of 19.7 inches during the typhoon's passage while stations in Saitama and Yamanashi prefectures received totals as high as 19.5 inches and 14.4 inches respectively. These heavy rains set off one of the worst floods in Tokyo since World War II. The swollen Tama River washed over its embankment at Komae, Tokyo prefecture flooding many homes and causing 7600 inhabitants to be evacuated from their homes.

Elsewhere, electrical power was cut off in Kochi and Hiroshima in the path of Polly's center due to the high winds and landslides downing power lines. On the coast, two 10,000 ton freighters, berthed under construction at Urato Bay near Kochi, were washed out to sea when the water level went up some 9 feet. In the typhoon's wake, Polly left over 10,000 homes destroyed or inundated and a casualty toll of 45 injured and 9 dead or missing.

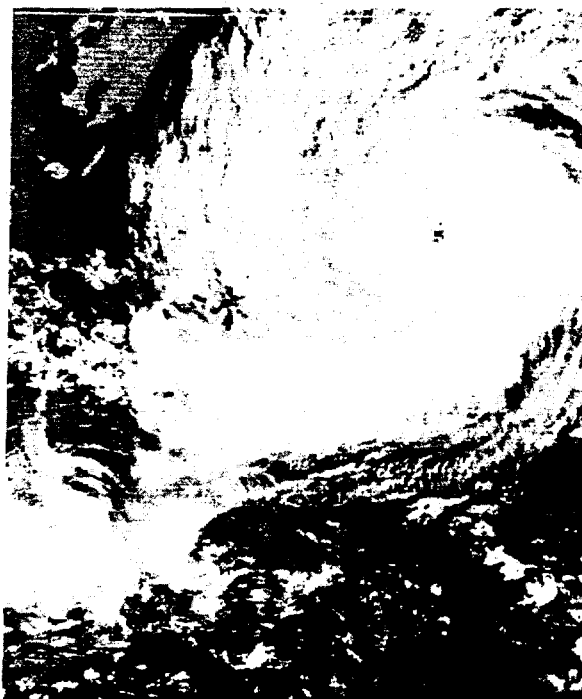
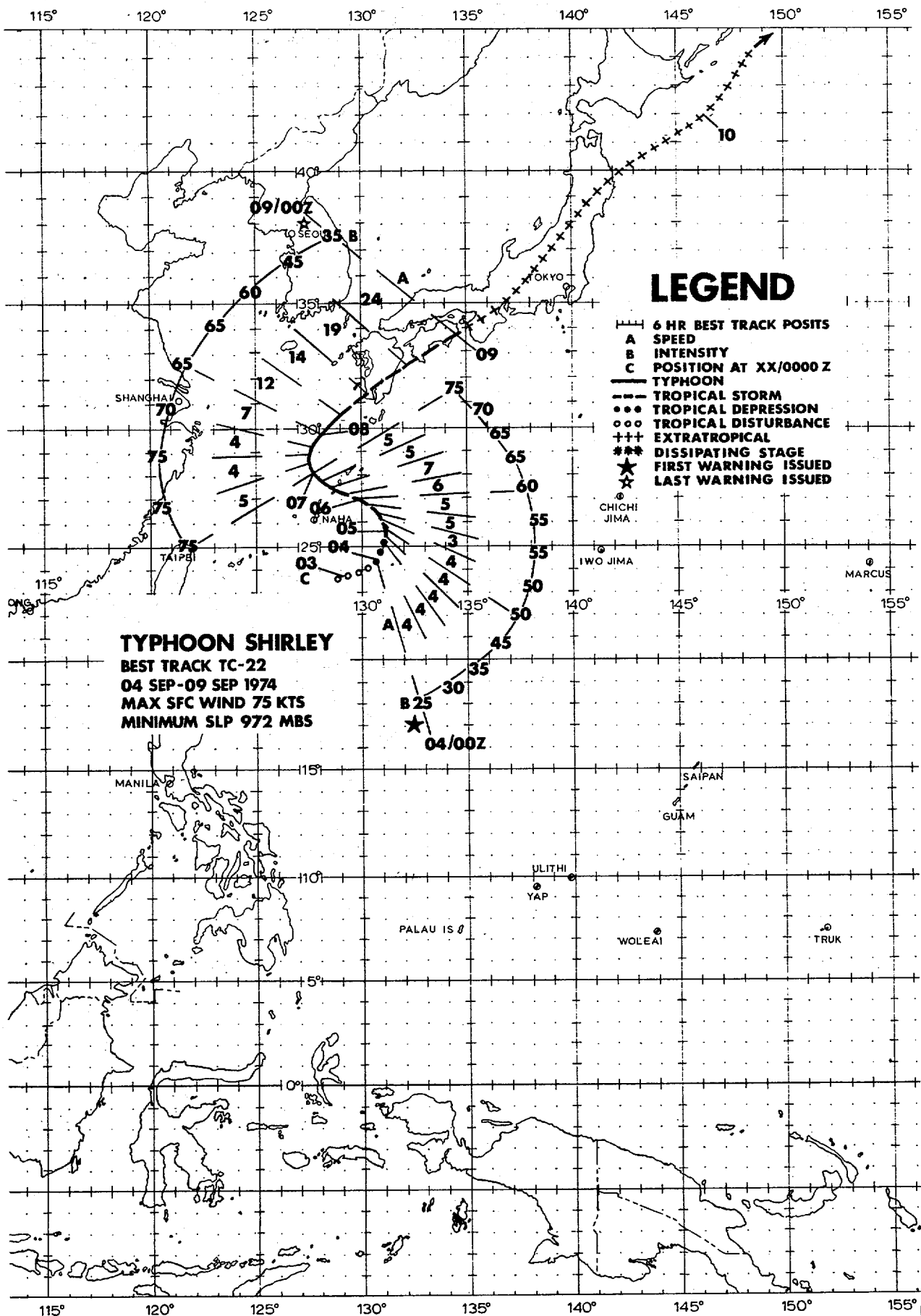


FIGURE 4-13. Typhoon Polly 250 nm south of Nagoya, Japan. Tropical Storm Rose appears further southwest of Polly centered 230 nm east of Naha, Okinawa. 30 August 1974, 2300Z. [DMSP imagery]



## SHIRLEY

As Polly transformed to an extratropical cyclone in the Sea of Japan, the monsoon trough reformed across the Philippine Sea from Taiwan to the Volcano Islands. On 3 September, a tropical cyclone was evident in synoptic and satellite data about 150 nm south of Okinawa. Drifting east and northeastward, Shirley was located about 60 nm south of Minami Daito Jima on the 4th when aircraft reconnaissance reports observed winds reaching storm force in the circulation's northern semicircle (Figure 4-14).

Located at the base of an upper level trough east of Korea, Shirley drifted slowly northward passing abeam of Minami Daito Jima early on the 5th. A minimum barometric reading of 986.0 mb was recorded at the island's weather station (05/0300Z). Peak gusts out of the south measured 54 knots (05/1300Z).

As the 500-mb trough over the Sea of Japan moved eastward on the 5th, rising heights north of Shirley caused the storm to turn westward. By the 6th, aircraft reconnaissance of Shirley indicated winds had reached typhoon force shortly before the storm's center passed over the island of Okinoerabu-Shima in the Ryukyu chain. (Figure 4-15) The barometer dipped to 977.4 mb on the island during center passage (06/1130Z), and, as winds shifted to the south-southeast, a peak gust of 82 knots was recorded (06/1310Z).

Shirley's circulation was rather small as gale force winds were limited to a radius of 75 nm of the center. To the north, Naze on Amami-O-Shima reported peak gusts to 43 knots (07/0150Z), while to the south the gust recorder at the Naha Observatory measured 44 knots (06/1530Z).

An approaching short wave over the

Yellow Sea began to draw Shirley on a slow poleward drift on the 7th. As the base of this trough by-passed the typhoon to the north, Shirley accelerated in a northeasterly direction on the 8th, landing 12 hours later slightly below typhoon force on the coastline of Kyushu. Prior to landfall, the center passed directly over Kusagakishima (elevation 454 feet) which experienced a barometric reading of 982.4 mb (08/0800Z) and sustained 10-minute winds of 70 knots.

The coastal city of Makurazuki, 10 nm south of center crossing, received wind gusts to 90 knots (08/1050Z) from the south-southeast followed by a minimum pressure reading of 985.9 mb (08/1120Z).

Accelerating to forward speeds of 24 kts, Shirley quickly passed Kyushu and Shikoku and transformed into a weak extratropical low over the Kii peninsula on the 9th. Strong gusty winds occurred along the southern coast of Shikoku as Shirley's center passed by late on the 8th. South-southeasterly winds peaking near 42 knots and 70 knots were recorded at Ashizuri and Murotomisaki (station elevation 745 feet) respectively.

Torrential rains brought by Shirley totaled 6.2 inches in 24 hours at Nobeoka on the eastern coast of Kyushu, while Tokushima on the eastern coast of Shikoku reported 7.5 inches (24 hours) during passage. The heavy rains halted the Japanese National Railway services in parts of Kyushu and completely in Shikoku. Power blackouts were also wide spread in Kyushu due to gusty winds downing power lines.

Landslides and flash flooding as a result of the rains were responsible for the flooding of over 30,000 homes, and a casualty toll of 13 dead or missing.

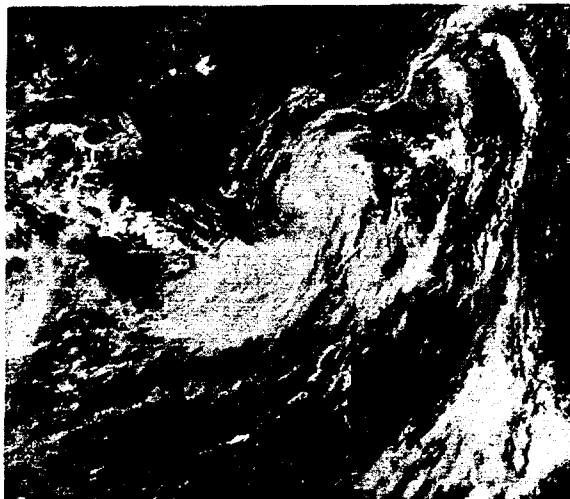


FIGURE 4-14. Formative stages of Shirley centered 180 nm southeast of Naha, Okinawa, 3 September 1974, 2329. [DMSP imagery]

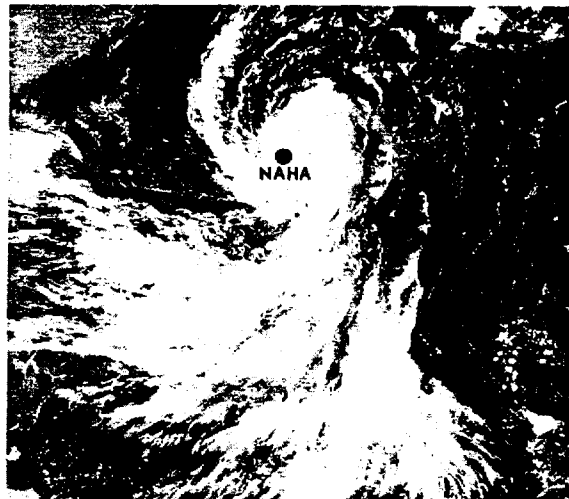
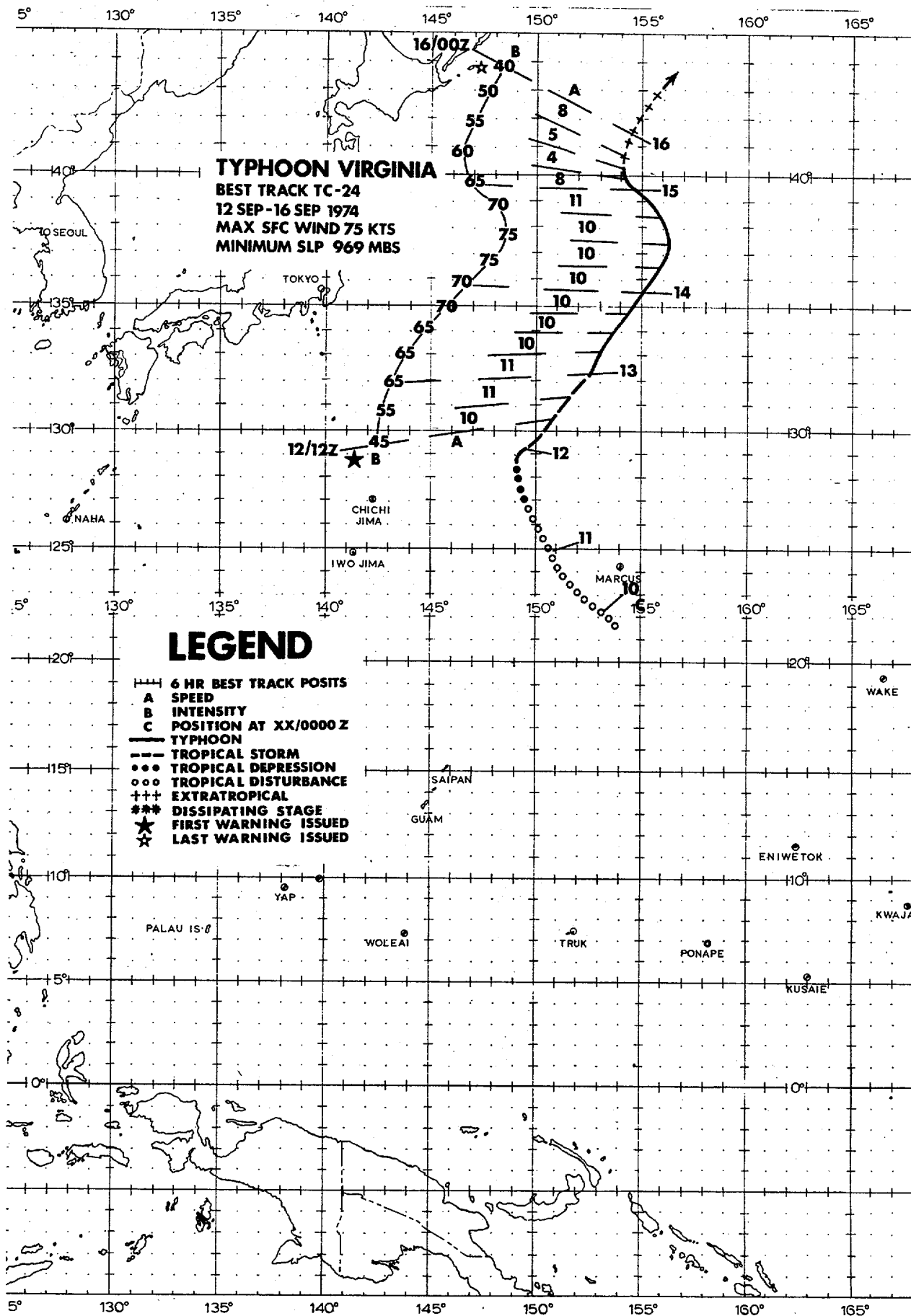


FIGURE 4-15. Shirley reaching typhoon strength 110 nm northeast of Naha, Okinawa, 6 September 1974, 0239Z. [DMSP imagery]



## VIRGINIA

Developing from a disturbance initiated by an upper tropospheric low, Virginia began to display increasing organization in satellite data early on the 11th, 200 nm west of Marcus Island. The circulation advanced northward, shifting to a northeast course and developed tropical storm force winds on the 12th. (Figure 4-16) By the time aircraft reconnaissance was conducted on Virginia late on the 13th, winds had increased to typhoon intensity. Flight level (700 mb) winds of 80 knots were measured in the southern semi-circle on penetration, while a central pressure of 980 mb was recorded within an eye 40 nm in diameter.

Virginia developed winds of typhoon strength at an unusual poleward latitude of 33°N. This was only the 6th tropical cyclone since 1945 to first achieve typhoon intensity north of the 30th parallel.

As a deepening 500 mb-low approached Manchuria from the Lake Baykal area on the 13th, the accompanying downstream ridging caused the westerlies north of Virginia to weaken and retreat poleward. As a result, the typhoon continued to track northeastward in a favorable vertical shear zone to maintain its intensity. Further aircraft reconnaissance of Virginia at 13/0730Z revealed the storm was still tropical in

character at the 37th parallel. The central pressure had dropped to 969 mb in an eye with a 700 mb temperature of 16C° (Figure 4-17). Maximum flight level (700 mb) winds of 90 knots were recorded just outside the eye in the wall cloud region.

By the 14th, a major trough was deepening over Manchuria causing a strong ridge to develop over the Kamchatka peninsula. By mid day, Virginia was blocked by an anomalous high pressure cell to the northeast, resulting in an unusual northwestward movement for a tropical cyclone located at such a northerly latitude (37N). Virginia's tropical lifetime ended shortly thereafter, as satellite data indicated weakening on the 15th and development of extratropical characteristics later in the day 400nm east of Hokkaido.

During the typhoon's northward track, numerous vessels in the shipping lanes were caught in its circulation and reported gale force winds. The strongest winds were experienced by a Netherlands ship (call sign PJSM) (40 knots) on the 13th and the PRESIDENT VAN BUREN (45 knots) on the 14th. The Japanese ship AKAISHI caught near the center on the 15th (0000Z) reported northeasterly winds of 57 knots and a barometer reading of 989.5 mb.

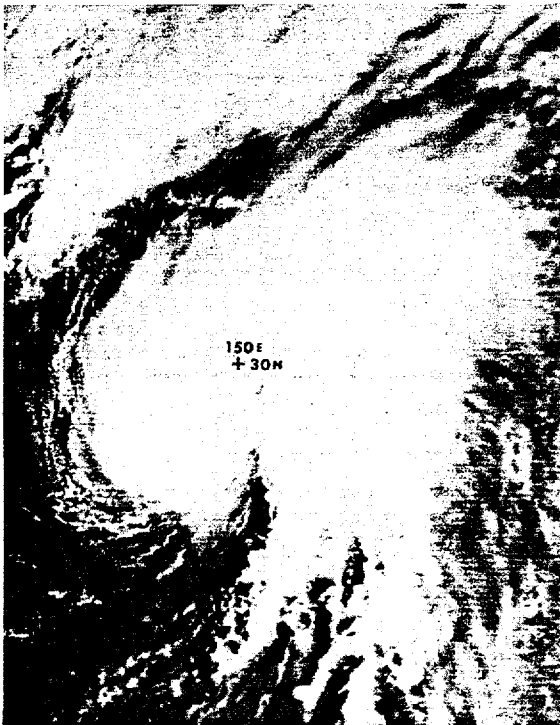


FIGURE 4-16. Tropical Storm Virginia 370 nm northwest of Marcus Island, 11 September 1974, 2243Z. (DMSP expanded imagery)

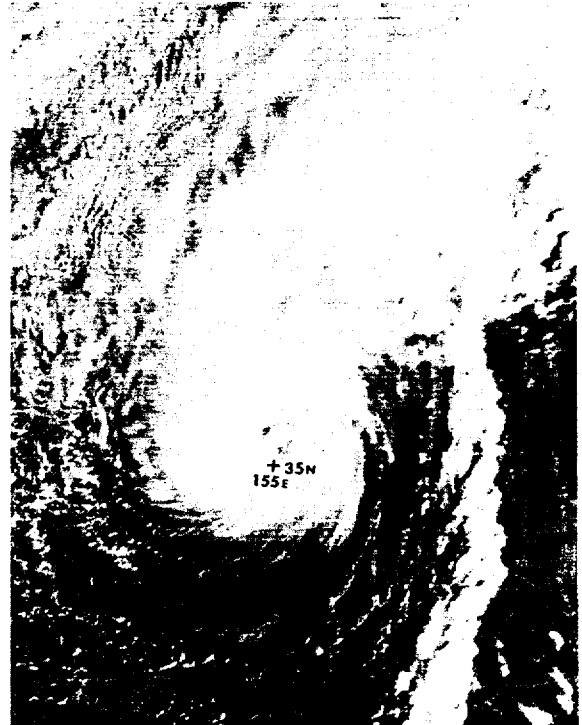
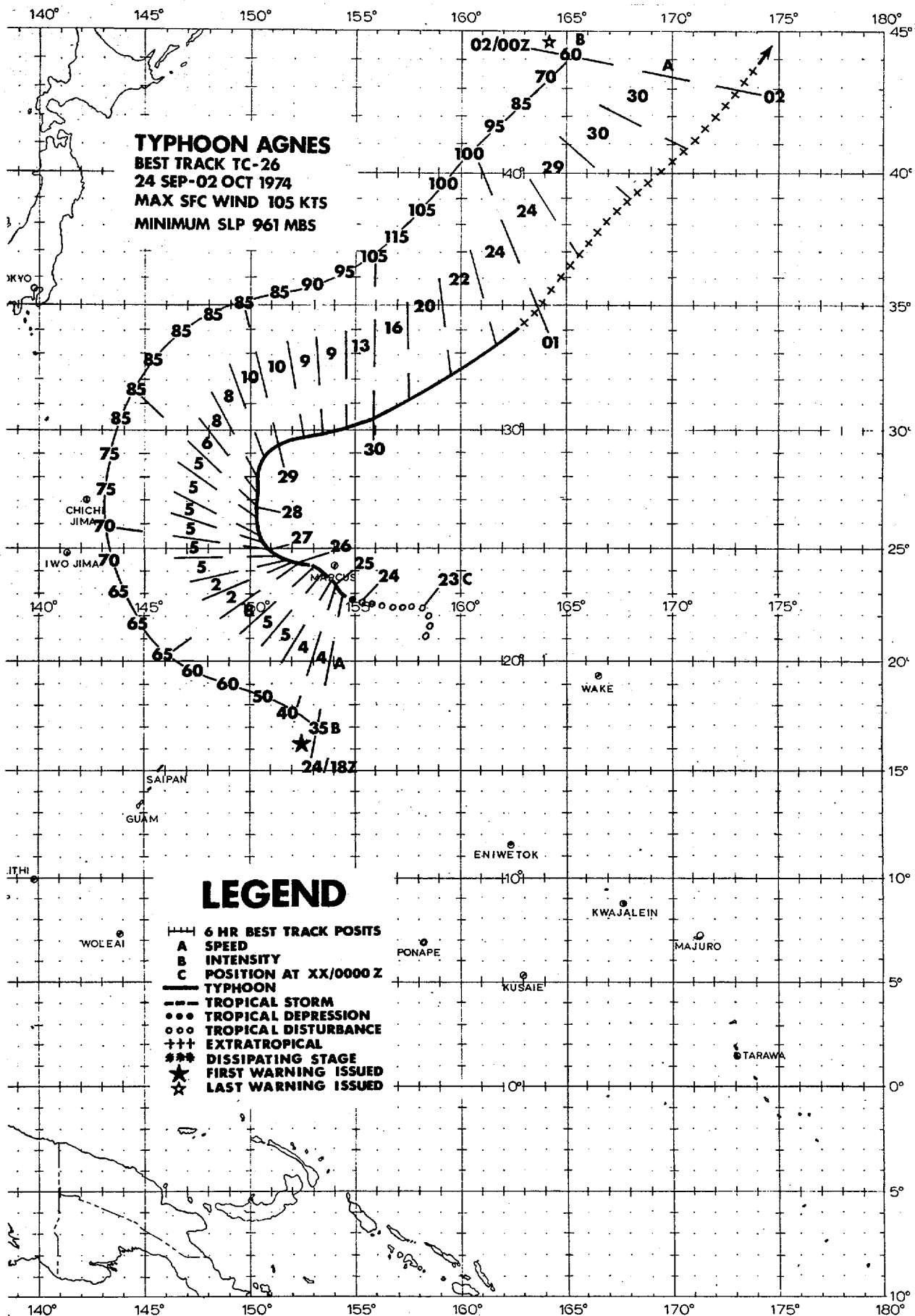


FIGURE 4-17. Typhoon Virginia near peak intensity after crossing the 35th parallel 750 nm east of Tokyo, 13 September 1974, 2207Z. (DMSP expanded imagery)



# AGNES

Evolving from a disturbance initiated by an upper tropospheric low, Agnes developed to depression intensity about 150 nm southeast of Marcus Island on 24 September. Although weak, the flow about the subtropical ridge to the north of the depression kept the tropical cyclone on a slow westerly and later a west-northwesterly track for the next three days.

Indications from satellite data revealed that the circulation was intensifying rapidly on the 25th. Proof of this development occurred when the center of Agnes passed about 60 nm south of Marcus Island later that day. The Japanese meteorological station on the island experienced strong easterly gusts to 81 knots (25/1140Z) following a minimum barometer reading of 998.7 mb (25/0600Z) (Figure 4-18). Aircraft reconnaissance of Agnes the next day (26/1450Z) confirmed that the storm had gained typhoon force. Flight level (700 mb) winds of 70 knots and a central pressure of 984 mb were reported.

As a cell in the subtropical ridge west of Agnes weakened significantly on the 27th, the typhoon began to abruptly track northward. With upper level westerlies strengthening east of Japan, Agnes shifted to an east-northeast track 36 hours thereafter, and accelerated in forward speed early on the 29th (Figure 4-19).

Like typhoon Virginia, Agnes continued to deepen after recurvature. Reconnaissance aircraft observed the lowest central pressure of the typhoon's life (961 mb) on the 30th (0303Z). In addition, flight level (700 mb) winds of 135 knots were observed 40 nm from the center during exit from the eye. Forward speed of Agnes at this time had increased to 15 knots.

Over the Kuril Islands, a 500 mb low was tracking eastward accompanied by a deep trough. The amplification of strong southwesterly flow ahead of the trough caused Agnes to turn on a northeast course and accelerate to 30 knots by 1 October. Satellite data indicated Agnes acquired extratropical characteristics after crossing 35°N; however, the circulation remained intense as evidenced by aircraft flight level (700 mb) winds of 110 knots (01/0415Z). The strong extratropical low of Agnes continued to race poleward thereafter, finally merging with the advancing 500-mb low 300 nm south of Attu in the Aleutian chain on the 3rd.

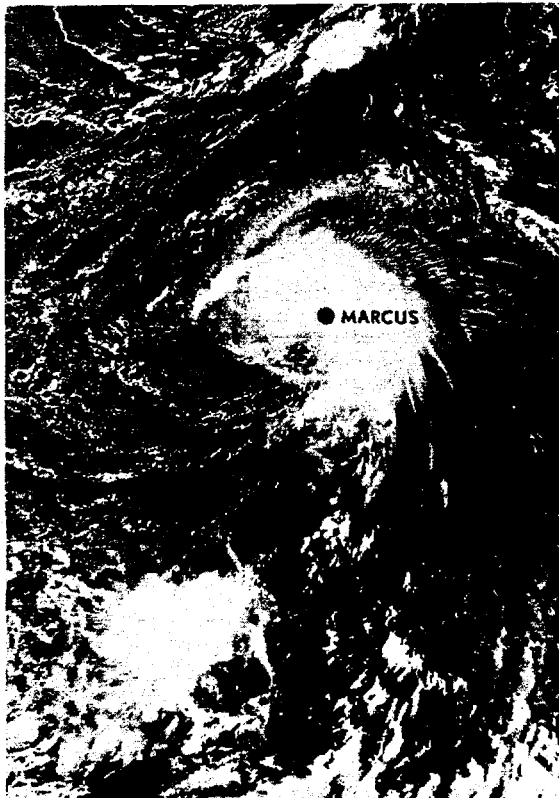


FIGURE 4-18. Agnes reaching typhoon strength 100 nm west of Marcus Island, 25 September 1974, 2151Z. (DMSP imagery)

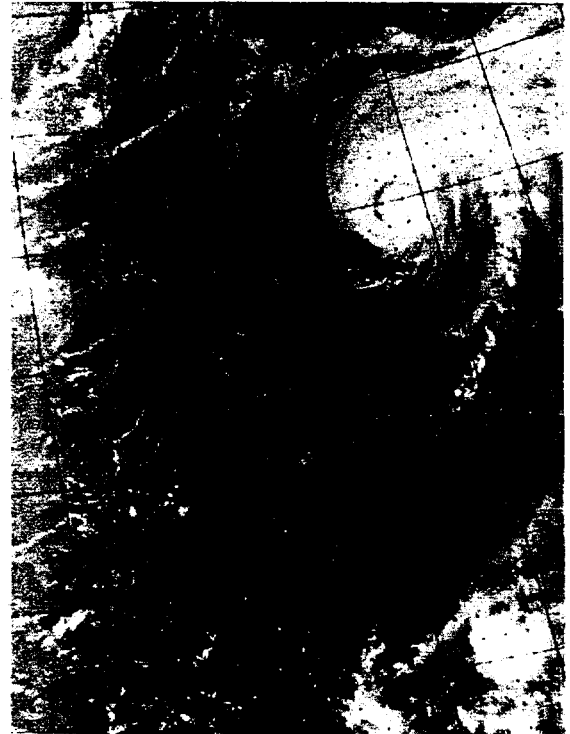
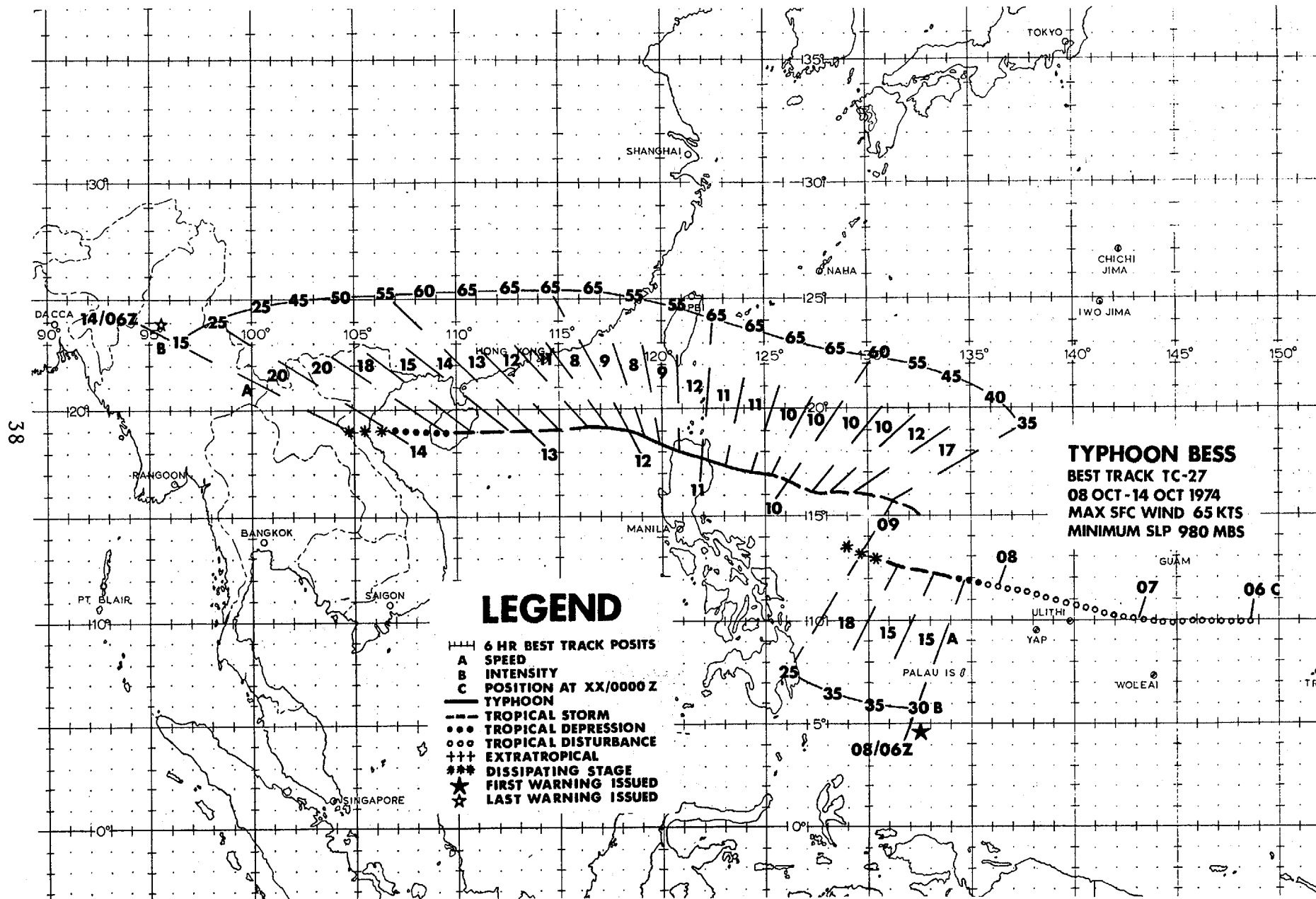


FIGURE 4-19. Moonlight visual of Typhoon Agnes after shift to an easterly track. Lights of Tokyo 750 nm to the northwest and other cities in Japan are visible in left-hand portion of data, 29 September 1974, 1119Z. (DMSP imagery)





The circulation that eventually developed into Typhoon Bess was first noted on synoptic charts south of Guam on 7 October (0000Z). The circulation was accompanied by broad monsoonal flow, and, by the 9th, evidence from satellite data and aircraft reconnaissance indicated two centers had developed (Figure 4-20). The northern system dominated, while the center that had initially been tracked for several days dissipated. Due to a strong subtropical ridge, movement of the entire circulation complex up to this time had been rapid, with a forward speed of 18 knots. Due to a deepening trough in the westerlies over the East China Sea, the pressures north of the storm weakened, and Bess slowed to almost half its original speed.

Winds in the cyclone reached typhoon intensity early on the 10th as it approached northern Luzon. Approximately 24 hrs later, coastal crossing occurred about 50 nm south of Escarpada Point. Inland, Tuguegarao City reported a pressure of 976.9 mb (the minimum reported during the storm's lifetime) while Bess's center passed 30 nm north of the station. Relatively unaffected by a short journey over the mountainous island, Bess emerged into the South China Sea as a minimal typhoon.

Bess's circulation brought high winds affecting much of Luzon and the straits. Inland, Baguio weather station (elevation 4860 feet) experienced wind gusts to 80 knots while Appari on the northern coast recorded a gust to 96 knots. In the Luzon straits several ships reported strong winds as the typhoon's center passed to the south on the 11th. The Indian ship BAILADIA and a German vessel (call sign DEBC) experienced northeasterly winds of 50 knots and 57 knots respectively. Considerable rainfall with 24 hour totals of 5 to 6 inches occurred over much of northern Luzon, with a 24 hour ex-

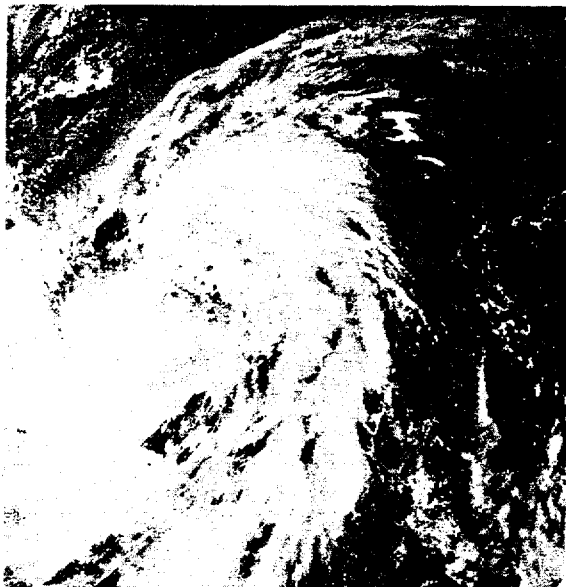


FIGURE 4-20. Tropical Storm Bess exhibiting a broad circulation center 500 nm east of Luzon Island, 9 October 1974, 0235Z.

treme of 30.8 inches measured at Baguio during passage. Landslides and flash flooding accounted for casualties of 26 killed and 3 missing. Total damage including public and private property, agricultural crops (rice), and livestock were estimated near \$9.2 million.

Once in the South China Sea, Bess turned westward in response to a massive high pressure area dominating central and South China. The combination of the typhoon's envelope of low pressure and this high pressure area generated a strong northeast flow over the waters south of the China coast. Pratas Island, 110 nm to the northwest of the typhoon's center, reported sustained (10 minute) winds of 50 knots on the 12th while the British ship MARCO POLO estimated winds of 45 knots 220 nm northwest of the center (Figure 4-21). As Bess tracked south of Hong Kong late on the 12th, peak gusts of 58 knots and 49 knots were observed at Wagland Island and the Royal Observatory respectively.

As the modifying northeast monsoon flow entered the typhoon's circulation, the central pressure began to fill and winds associated with Bess dropped to tropical storm strength on 13th. Bess increased in forward speed crossing Hainan Island late in the day and weakened to depression intensity. Emerging into the Gulf of Tonkin, the circulation continued to weaken, eventually dissipating on the North Vietnam coast early on the 14th.

In addition to the damage wrought on the Philippines, Bess claimed a U. S. Air Force reconnaissance aircraft in the South China Sea south of Hong Kong on the 12th. Last contact with the mission occurred while the aircraft was collecting peripheral data in the typhoon's northern semicircle. Nothing was ever heard again of the plane or its crew of six.

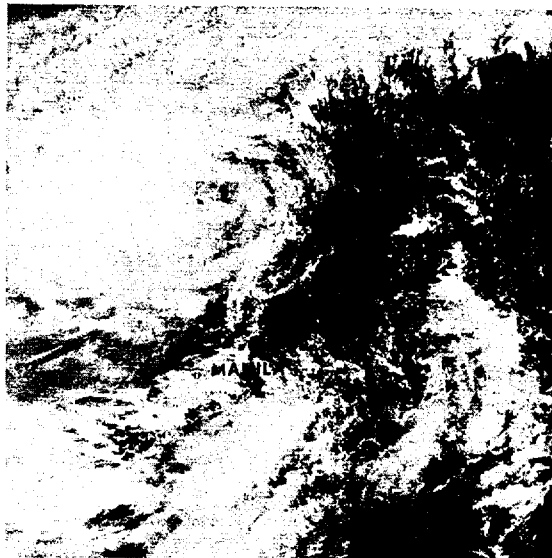
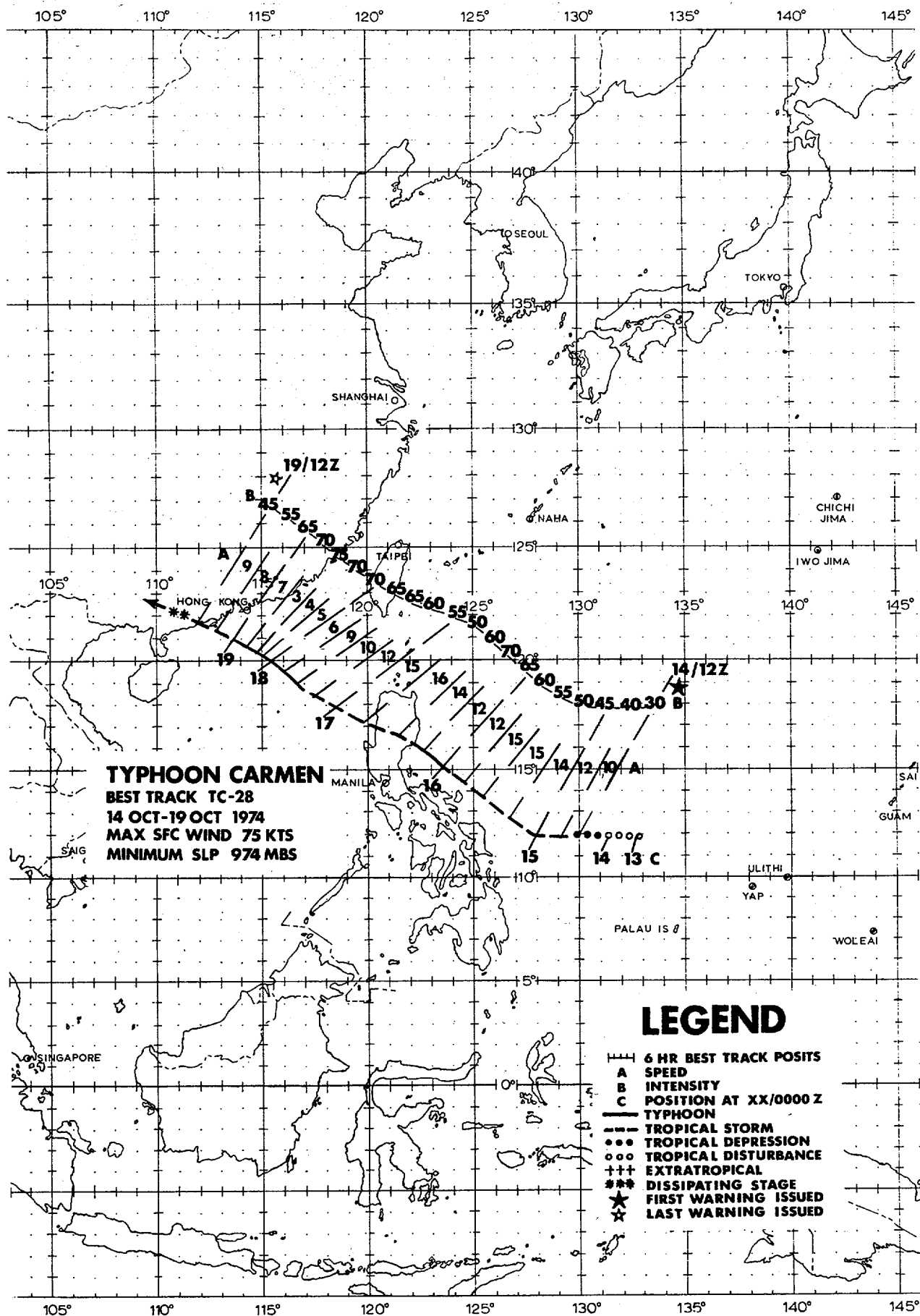


FIGURE 4-21. Bess of minimal typhoon strength in the South China Sea 290 nm southeast of Hong Kong, 12 October 1974, 0321Z. (DMSP imagery)



# CARMEN

As Bess passed south of Hong Kong, the monsoon trough in the Philippine Sea produced another circulation west of Yap. This system moved westward displaying increasing organization on satellite data. Reports received from the Liberian ship ASIAN MORALITY (west wind 45 knots, pressure 998.5 mb) passing close to the center on 15 October (0000Z) confirmed that Carmen had reached tropical storm strength 180 nm east of Samar Island.

Intensifying further, Carmen turned on a northwest course and headed for northern Luzon. Some 12 hours prior to arrival on the Luzon coast near Casiguran, aircraft reconnaissance reported a central pressure of 974 mb (lowest during the lifetime of storm) and winds of minimal typhoon force (Figure 4-22).

Casiguran reported gusts to 59 knots and a minimum pressure of 981.2 mb as the center passed just north of the station. Maximum 24 hour rainfall recorded as the storm cut across Luzon was at Baguio (8.98 inches). Casualties in the wake of Carmen amounted to 13 dead, and damage losses were estimated near \$11.6 million.

Elsewhere, eastern Taiwan suffered crop damage near \$1.4 million due to the heavy rains associated with typhoons Bess and Carmen. Newspaper reports indicated 11 persons killed on Taiwan.

As Carmen entered the South China Sea, weakening pressures over east central China influenced the typhoon to slow in forward speed. On the 18th, satellite intensity estimates indicated Carmen probably reached a peak strength of 75 knots about 120 nm south of Hong Kong as the storm edged slowly north-westward.

During the 18th, several ships caught in Carmen's circulation reported strong winds. An unidentified vessel experienced northerly winds of 45 knots 150 nm northwest of the typhoon's center, while the Norwegian ship JARAMA reported easterly winds of 50 knots 130 nm to the northeast (both reports 18/0000Z). Later the U. S. ship RAPHAEL SEMMES passing south of the center reported 60 knot winds at 18/1200Z and 19/0000Z.

Following passage of an upper level trough over the Yellow Sea on the 18th, a high pressure ridge began to penetrate into South China, causing a northeasterly flow of modified air from the land mass into the typhoon's circulation. Within 24 hours, Carmen's central pressure began to fall rapidly, and winds dropped to tropical storm force. Turning on a more westerly course, Carmen weakened to depression strength and later dissipated east of the Luichow peninsula early on the 20th.

The center of Carmen approached within 70 nm of Hong Kong on the 19th producing considerable rainfall and gale force winds in the Colony. Peak gusts of 70 knots were observed both at Waglan Island and the Royal Observatory. Maximum rainfall during the 3 day period (18-20 October) totaled 18.1 inches (Figure 4-23). Carmen brought much needed rain to the Colony which was suffering from a drought; however, heavy downpours flooded many low-lying areas and caused landslides and road collapses. Newspaper reports indicated extensive crop damage due to flooding caused by the rains. Two lighters went aground and four other vessels broke away from their moorings. One fatality was attributed to Carmen in the Colony.

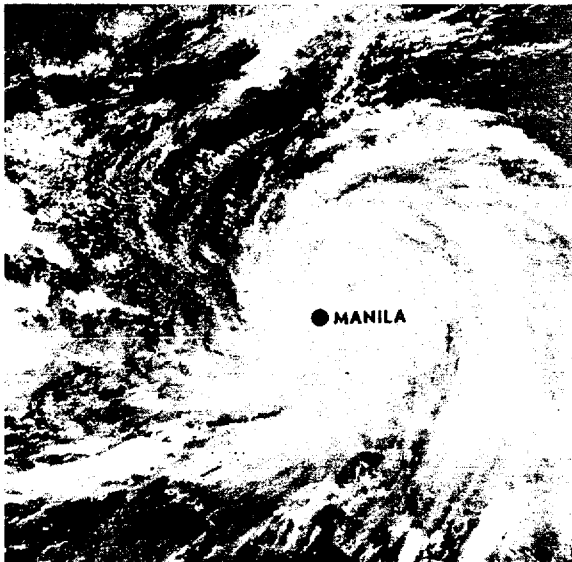


FIGURE 4-22. Typhoon Carmen a few hours prior to landfall on Luzon near Casiguran, 16 October 1974, 0348Z. (DMSP imagery)

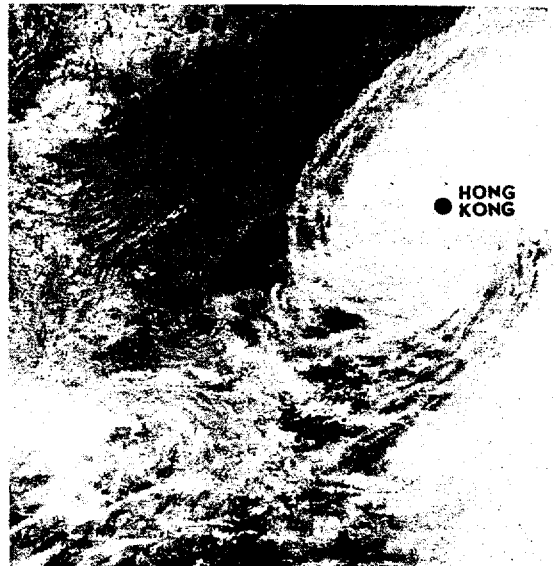
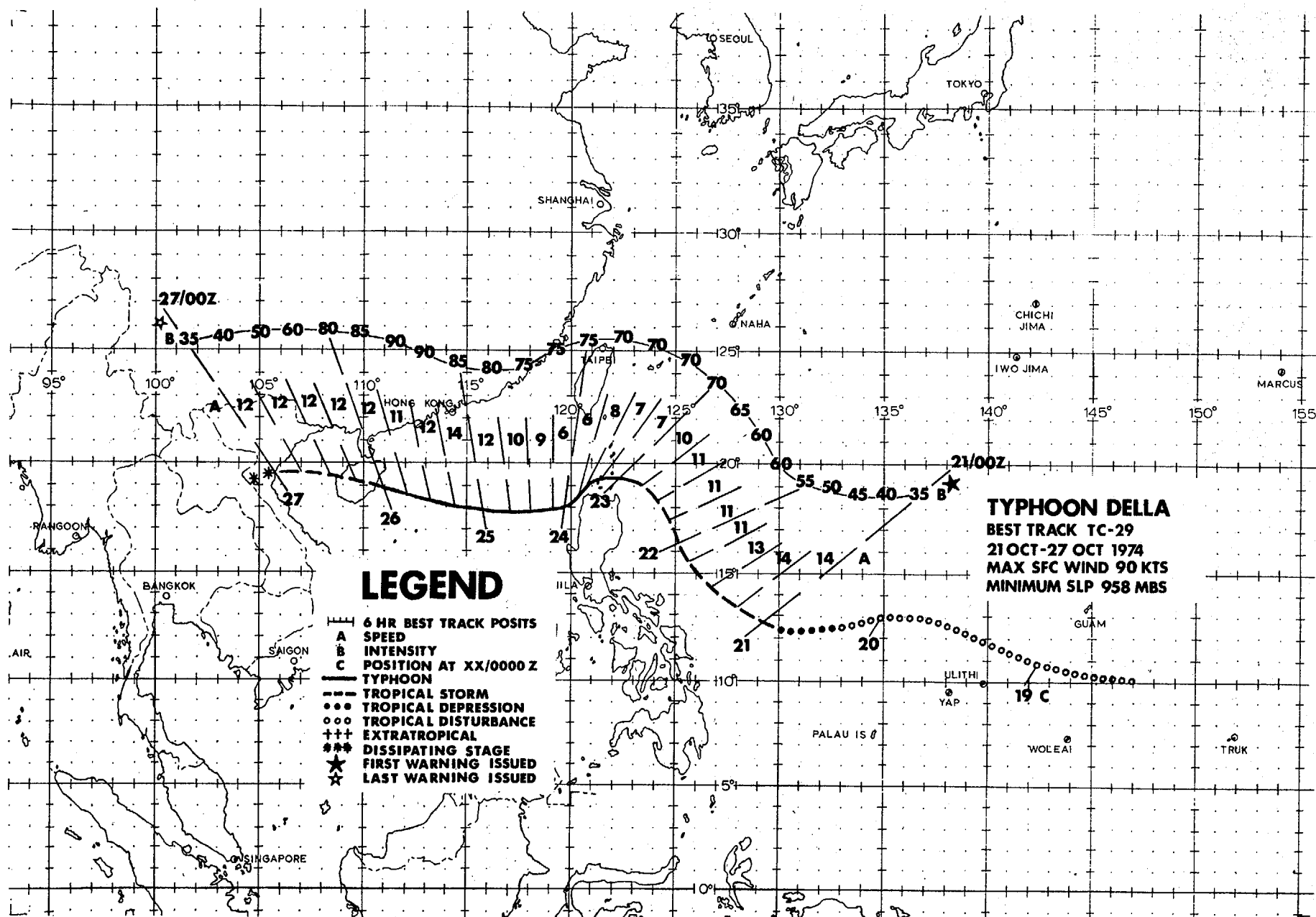


FIGURE 4-23. Tropical Storm Carmen approaching the South China coast 90 nm southwest of Hong Kong, 19 October 1974, 0434Z. (DMSP imagery)



# DELLA

The third in a succession of tropical cyclones developing during October, Della formed in the monsoon trough south of Guam while Carmen weakened in the South China Sea on the 19th. Two days later, the circulation intensified to tropical storm strength approximately 250 nm east of Samar Island (Figure 4-24).

The subtropical ridge north of Della eroded quickly on the 21st as a major short wave in the westerlies approached from China. Della was drawn up into the weakness as the storm shifted to a northwest and later a north-northwest track. While winds about the center reached typhoon force, the short wave trough bypassed the meridian of Della late on the 22nd. With passage of the trough, a strong mass of high pressure advanced into southeast China and blocked further poleward movement of Della. The typhoon responded by turning sharply westward.

Navigating the Luzon straits during the 23rd, Della's center shifted southwestward and skirted the Luzon coast near Cape Bojeador. During this period, strong gusty winds swept the northern Luzon coastline. Aparri measured a gust to 85 knots from the

south after center passage, while Laoag reported southwesterly winds gusting to 56 knots. Vigan, on the west coast, received the heaviest 24-hour rainfall (3.1 inches). Only slight damage occurred in the Philippines due to the center avoiding landfall.

Charting a westward course across the South China Sea as a relatively small typhoon, Della intensified steadily. A Japanese ship the YAMAMIZU MARU encountered winds of 60 knots southeast of the center on the 24th (0600Z) while the Israeli ship NURITH reported 60 knot winds as it crossed west of Della's eye 12 hours later (24/1800Z). Aircraft reconnaissance of Della on the 25th (0456Z) measured a central pressure of 958 mb (lowest recorded during the storm's life) within a tight eye 15 nm in diameter (Figure 4-25).

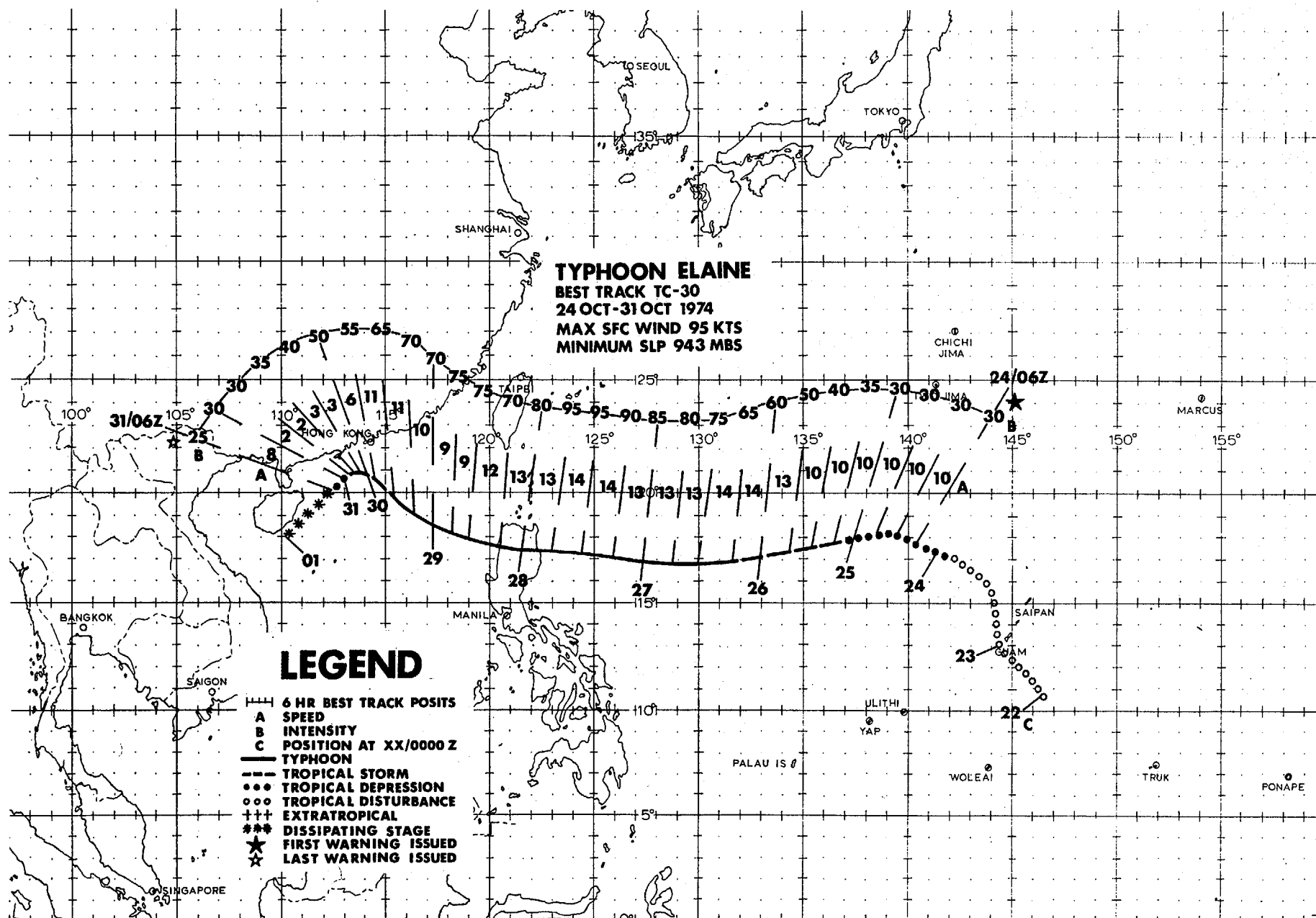
Intensity estimates from satellite data suggested that Della weakened slightly before landfall on Hainan Island on the 26th. Emerging into and crossing the Gulf of Tonkin, the storm never regained its former intensity. Following coastal crossing of North Vietnam early on the 27th, the circulation weakened and subsequently disappeared from synoptic analyses.



FIGURE 4-24. Della achieving tropical storm strength in the Philippine Sea 210 nm east of Samar Island, 21 October 1974, 0023Z. (DMSP imagery)



FIGURE 4-25. Typhoon Della near peak intensity in the South China Sea 280 nm south of Hong Kong. 25 October 1974, 0052Z. (DMSP imagery)



## ELAINE

Elaine, the largest of the typhoons to traverse the Philippine Sea during October, was upgraded from tropical depression status early on 25 October about 550 nm northwest of Guam. Developing from a circulation in the monsoon trough near Guam (the fourth to form in the trough during October), the envelope of Elaine's 1000 mb isobar eventually grew to 500 nm in diameter prior to striking Luzon a week after initial detection (Figure 4-26). During this period, Elaine intensified markedly as aircraft reconnaissance of the typhoon, 12 hours prior to striking Luzon, observed a central pressure of 943 mb and 700 mb flight level winds of 110 knots.

The same high pressure regime that forced Della on a westerly track through the Luzon straits on the 23rd extended eastward, and, late on the 24th, blocked Elaine (as a depression) from any further poleward movement. For a period of three days, Elaine was influenced by this ridge of high pressure to the north, forcing the typhoon on an atypical westerly heading across the Philippine Sea - an anomalous track for October tropical cyclones developing near the Marianas which normally follow a northward recurving course.

Elaine, the most severe typhoon to strike Luzon in the month, brought strong winds over a large expanse of the northern Philippines. Inland, Tuguegarao City observed a minimum pressure of 958.7 mb (27/2300Z) and peak gusts to 96 knots as the center passed south of the station. The west coast station of Vigan recorded a minimum pressure of 972.0 mb with an extreme gust of 100 knots (28/1100Z) as the center emerged into the South China Sea. Newspaper reports indicated the winds were strong enough to lift a new galvanized iron roof off a centuries old cathedral in Vigan. Manila (180 nm to the south) received gusts to 43 knots. Baguio (elevation 4860 feet) experienced extreme winds of 76 knots when the center passed 70 nm to the north.

Elaine brought 24-hour rainfall totals of 3 to 4 inches to northern Luzon while Manila reported 10.5 inches. An extreme 24-hour amount of 32.2 inches was reported at Baguio. The heavy rains combined with those brought by Della several days earlier left most farmlands under water.

Damage was extensive in Luzon with estimates of losses to crops, private and public properties amounting to \$21 million. Thousands of homes were destroyed or damaged with some 300,000 persons left homeless. A total of 23 persons were listed as killed, 14 of whom were lost when swept off a ferryboat in the Sibuyan Sea.

Maritime casualties were high as 20 Philippine fishermen were counted missing in coastal waters. At sea, the 39-ton Japanese vessel KOSHU MARU sank east of Luzon with its crew of 11 presumed lost. The 3800 ton Korean ship MOKPO reported flooding and serious damage near the Luzon straits.

Elaine turned westward then west-northwestward while moving across the South China Sea as the region of high pressure dominating China weakened. During the 28th and 29th, the typhoon's circulation brought strong winds to several merchant vessels. The highest values reported were from the Japanese vessel OYLMPIUS MARU experiencing 50 knots west of the center on 28/1200Z as Elaine was emerging from the Luzon coast, and later from the Russian ship ALEXANDER IVANOV on the 29th (1200Z) 120 nm north of the center who reported winds of 50 knots. Pratas Island observed sustained (10-minute) winds of 45 knots as Elaine's center passed 120 nm to the south on the 29th.

As the typhoon advanced northwestward, pressure over South China continued to fall causing Elaine to slow to almost a stall 90 nm south of Hong Kong late on the 29th. At this time, an onset of northeast monsoon flow influenced Elaine's circulation with subsequent filling and rapid weakening of winds about the center to storm strength. By the 31st, Elaine was reduced to a tropical depression and forced southwestward by an advancing high pressure ridge over South China. One day later the circulation dissipated southeast of Hainan Island.

During the cyclone's close proximity to Hong Kong, Elaine brought gale force winds to the Colony. The Royal Observatory registered a gust of 52 knots, while winds peaked to 55 knots on Waglan Island. A two-day (30th & 31st) rainfall amount of 8.6 inches was measured at the Royal Observatory while Elaine stalled offshore.



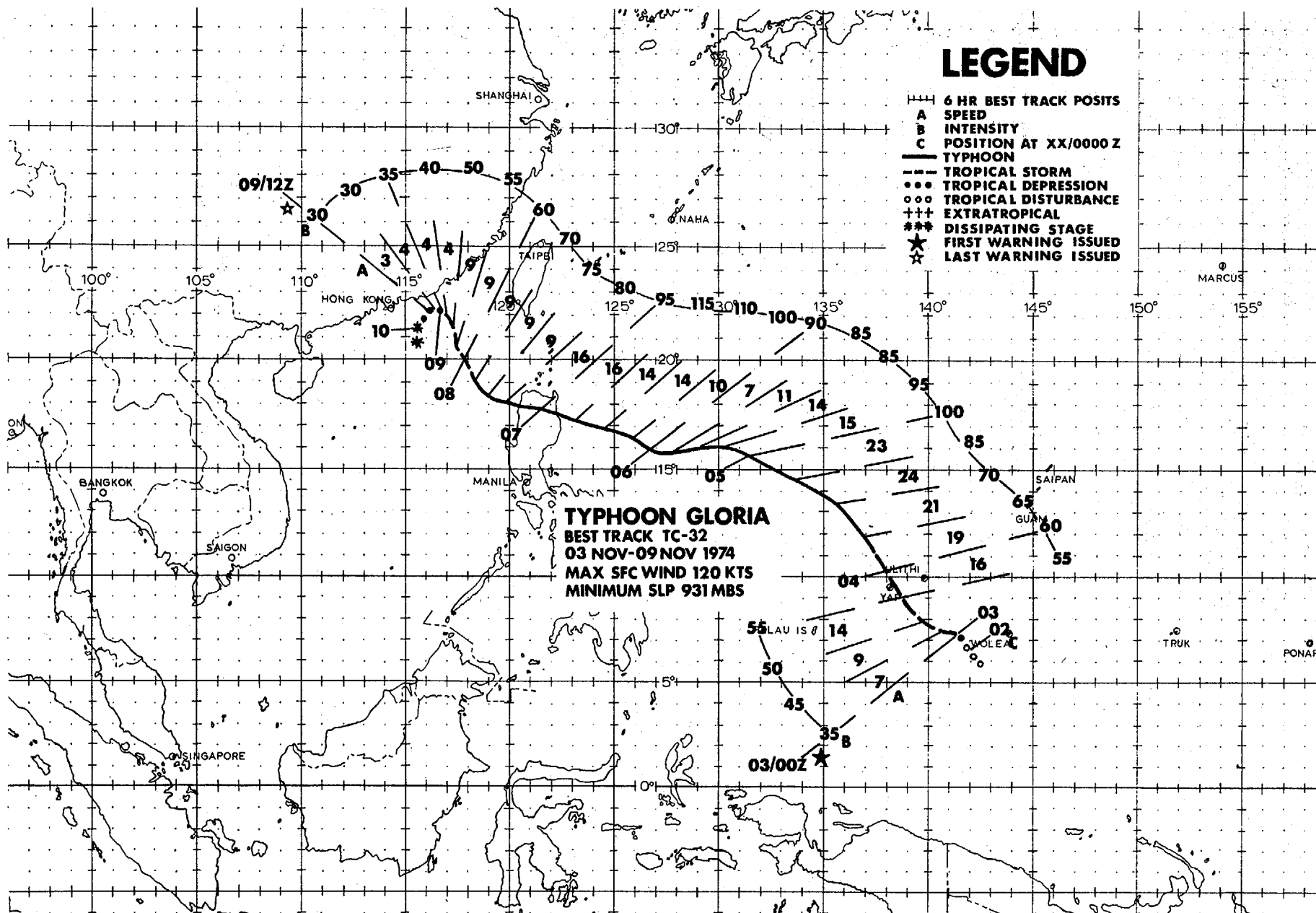
FIGURE 4-26. Massive Typhoon Elaine 300 nm east of Luzon, one day prior to the center striking the island, 27 October 1974, 0015Z. (DMSP imagery)



# LEGEND

- 6 HR BEST TRACK POSITS
- A SPEED
- B INTENSITY
- C POSITION AT XX/0000 Z
- TYPHOON
- TROPICAL STORM
- ... TROPICAL DEPRESSION
- ... TROPICAL DISTURBANCE
- +++ EXTRATROPICAL
- \*\*\* DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ★ LAST WARNING ISSUED

46



## GLORIA

Gloria, like Elaine, developed a large circulation with the cyclone's 1000 mb isobar reaching 400 nm in diameter while traversing the Philippine Sea. Gloria, however, developed to these dimensions early in its life as the storm reached typhoon force 50 nm north of Yap Island on 4 November (Figure 4-27). Earlier Gloria, developing from a depression in the active monsoon trough, had passed about 10 nm northeast of Yap Island. The island's weather station registered a minimum pressure of 985.7 mb at 03/2020Z and later a peak gust of 46 knots as winds shifted to the west.

The building of a strong surface ridge southwest from Marcus Island subjected Gloria to a tightening gradient and strengthening flow in the right semicircle. Strong winds were observed at a considerable distance to the northeast with Andersen AFB Guam, 350 nm from the center, observing gusts to 46 knots midday on the 3rd.

Gloria commenced an unusual acceleration in forward speed up to 24 knots during the 4th - twice the normal for the area. Moving some 500 nm in 24 hours, Gloria occupied the central Philippine Sea early on the 5th. The FREDRICK LYKES caught west of the center at 05/0000Z reported northwest winds of 60 knots, while the barometer dipped to 983.4 mb.

Rapid deepening occurred once typhoon force was attained early on the 4th as Gloria's central pressure fell at a rate of 2.3 mb/hr during the rest of the day culminating in a minimum of 937 mb at 05/0400Z. Aircraft reconnaissance of the central core region early on the 5th proved extremely difficult as the eye diameter was only 4 nm. Subsequently, the typhoon's central pressure rose to 955 mb during the next 12 hours as Gloria's forward motion slowed temporarily to 10 knots. Following the rapid filling process, the typhoon's central pressure began an unusual second deepening as Gloria once again increased in forward speed (15 knots) targeting in on northern Luzon. The last aircraft reconnaissance of the typhoon in the Philippine Sea (10 hours before landfall) revealed Gloria had strengthened markedly--700 mb flight level winds of 120 knots during penetration and a minimum pressure of 931 mb at 06/0916Z (lowest pressure recorded during the year).

Following landfall, Gloria cut across Luzon in 6 hours. Maximum winds recorded during the cyclone's passage occurred at the northern coastal station of Aparri which reported gusts to 96 knots from the northeast and Vigan on the west coast registering south-southwest winds peaking at 94 knots. Laoag received winds gusting to 81 knots prior to Gloria's emergence in the South China Sea. The island town of Tugubgarao, 20 nm south of the center's path, observed the lowest pressure--972.9 mb. Rainfall amounts for a 24-hour period ranged from 3.8 inches at Aparri to 7.8 inches at Tugubgarao while Baguio reported an extreme of 18.9 inches.

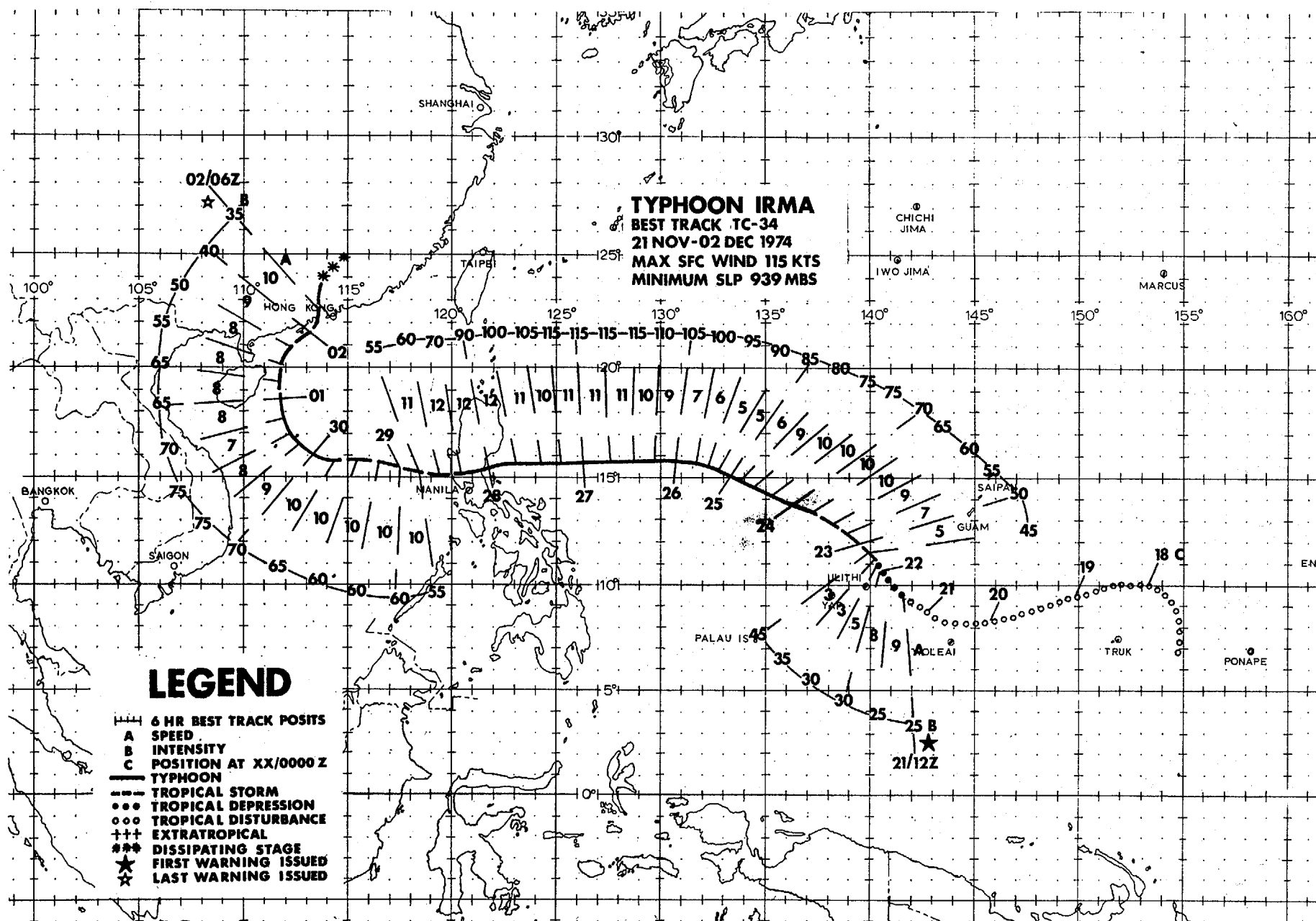
Gloria climaxed a series of five typhoons which affected Luzon in less than a month--a record frequency dating back to 1945. Newspaper reports indicated \$3.2 million in damage to crops and public and private property as a result of Gloria. Over 700 homes were destroyed by wind or inundated by floodwaters leaving close to a 1000 persons homeless. A casualty toll of 10 persons was reported in the typhoon's wake mostly due to drownings.

As Gloria exited Luzon into the South China Sea on the 7th, its forward motion slowed and a gradual northward track commenced as surface pressures were anomalously low over South China. However, like Elaine, Gloria failed to reach the China coast. A massive high pressure area from Manchuria began to penetrate into central China on the 9th blocking further northward progress. The influx of modified air off the mainland due to the onset of a northeast monsoon began to affect Gloria by midday of the 8th as the circulation dropped in intensity to storm force. Reduced to a tropical depression by the 9th, Gloria began to drift southward and dissipated on the 10th as pressures continued to build over South China.

During the storm's transit of the waters west of Luzon during the 7th and 8th some of the highest winds reported by merchant vessels during the year occurred. Winds of 65 knots were reported from a British vessel (call sign MYCE) (07/1200Z) and a Kuwait ship (call sign 9KSD) (08/0000Z) as both vessels passed within 60 nm of the eye.



FIGURE 4-27. Gloria achieving typhoon strength 100 nm north of Yap Island in the Philippine Sea, 4 November 1974, 0300Z. [DMSP imagery]



## IRMA

The year's last typhoon, Irma terminated the barrage of late season typhoons to strike Luzon Island of the Philippine archipelago during October and November.

Initial development of Irma took place south of Guam as a depression in the monsoon trough. Passing north of Ulithi atoll on 22 November (Figure 4-28), Irma's circulation intensified rapidly producing typhoon force winds late on the 23rd. Like Elaine and Gloria, Irma's circulation dominated the Philippine Sea with the diameter of the 1000 mb isobar extending about 450 nm by the 23rd. The central pressure of the typhoon plummeted after passage of Ulithi until a minimum of 939 mb was recorded by aircraft reconnaissance 3 1/2 days later at 26/0635Z. Sustained surface winds generated around Irma's eye were estimated to be 115 kts during the 26th as the typhoon reached its peak intensity 400 nm east of Luzon.

Late on the 25th a massive high pressure ridge extending eastward from China to the Ryukyu chain prevented further poleward movement by Typhoon Irma near 16°N (Figure 4-29). This ridge dominated the region north of the typhoon through the 27th forcing Irma on an almost straight westerly track until it crossed the coast of Luzon. The turn of Irma to the west was very unusual. After reaching such a poleward latitude in the Philippine Sea few November typhoons fail to recurve.

Of the ships caught in the typhoon's gale force wind area in the Philippine Sea, the vessels MIKUNISAN MARU (200 nm west of the center at 25/1200Z), and a British ship (call sign GPIP) 200 nm northeast of the center at 26/0000Z) both reported 45 knot winds.

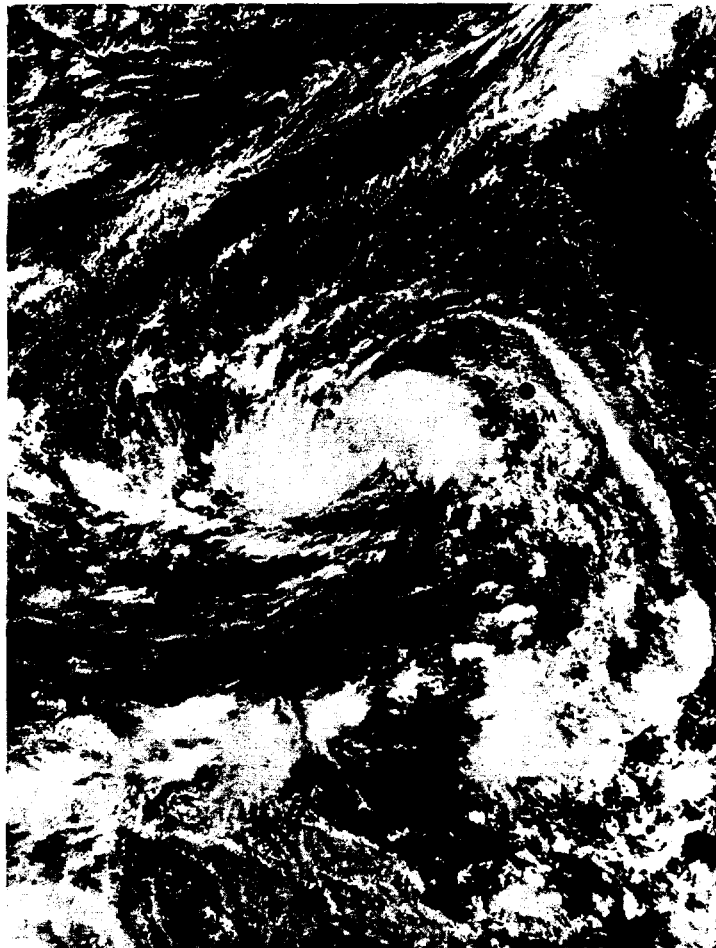


FIGURE 4-28. Irma strengthening to tropical storm intensity 300 nm southwest of Guam, 22 November 1974, 0229Z. (DMSP imagery)

Maritime casualties included several ships caught in heavy seas produced by Irma's peripheral winds. The 5 ton Liberian ship PACIFICOEVERTT ran aground near Siarago Island in the southern portion of the Philippine archipelago, while the 4 1/2 ton Singapore ship FWSAN met the same fate at Nazasa Bay on Subic Bay. Reports from Catabato, Mindanao indicated the 2 ton Philippine vessel ZAMBOANGA CITY capsized and sunk offshore but all the crew survived. Not so fortunate was the 3 ton Panamanian ship GREEN HILL which sank after the cargo shifted 60 nm north of Miyako Jima in the Ryukyu chain. Of a crew of 20, four were lost.

Striking Luzon early on the 28th, the eye of Irma crossed the coastline 30 nm south of Baler, passing directly over Clark Air Base, later exiting Luzon near Iba on the west coast. Peak gusts of 74 knots and a minimum pressure of 983.9 mb were experienced at Baler. Later Clark AB recorded a barometric reading of 979.0 mb in the eye at 28/0700Z while registering a peak gust of 83 knots from the northwest at 28/0500Z. This was the highest recorded gust at Clark AB since before World War II. As Irma's eye emerged on the west coast, east-southeast-

erly winds peaking at 58 knots occurred at Iba as the pressure dropped to 983.5 mb.

Twenty-four hour rainfall totals from Irma generally varied from 2 to 5 inches over Luzon with an extreme of 6.7 inches recorded at Cubi Point Naval Air Station. This amount broke previous station records for the month of November (previous 24-hour maximum was 5.3 inches).

Irma brought strong gale force winds to the metropolitan area of Manila. A gust to 51 knots from the southwest was reported at the international airport while the port area experienced westerly winds gusting to 60 knots. Several ships in Manila Bay were reported blown almost to the Roxas Boulevard seawall during the seige.

Damage to public and private buildings, public works, crops, and livestock was estimated at \$7.3 million. Over 1000 homes were reported destroyed or partially damaged by the winds. Newspaper reports indicated Irma claimed 11 lives in addition to sinking several small vessels and fishing boats.

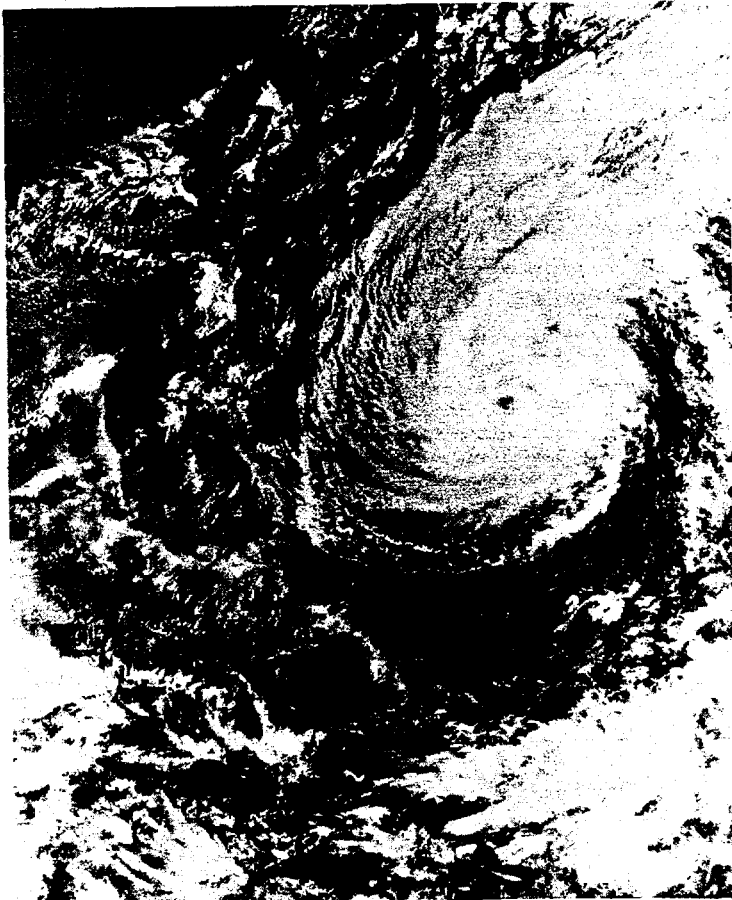


FIGURE 4-29. Massive Typhoon Irma in the central Philippine Sea 500 nm east of Cantanduanes Island, 25 November 1974, 0315Z. [DMSP imagery]

As Irma departed Luzon, the ridge of high pressure over South China weakened, allowing the cyclone, then of tropical storm strength, to take a slight poleward motion during its track across the South China Sea. Late on the 29th, pressure began to fall over southwestern China as remains of a tropical depression (formerly T.C. 30-74) moved into the area from Burma. Irma briefly regained typhoon strength during this period, and abruptly turned to the north on the 30th passing over the Paracel Islands. A meteorological station in the islands observed a pressure minimum of 970.5 mb (30/1200Z) and sustained (10 minute) wind of 60 knots as winds shifted from the west at 20/1500Z. Based on available records since 1945, no tropical cyclone has been as intense as Irma so late in the season in the northern South China Sea.

Passing abeam of Hainan Island on 1 December, Irma dropped below typhoon strength and rapidly filled while approaching the South China coast. Tracking 30 nm west of Hong Kong the circulation dissipated inland one day later. Maximum rainfall brought to Hong Kong by the weakening storm was 7.0 inches recorded at the Royal Observatory during the 2nd, while southerly winds gusting to 34 knots were observed at Cheung Chau. It is noteworthy to mention that Irma was the latest tropical storm on record to affect the South China coast.

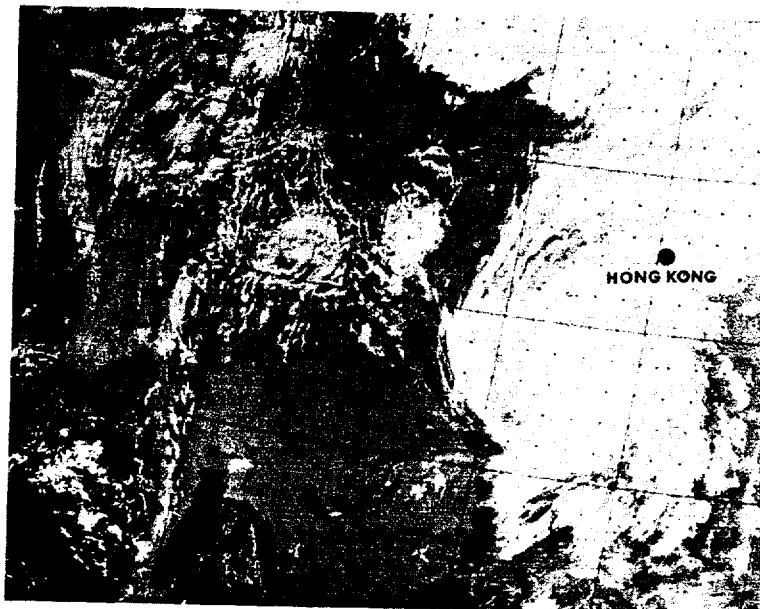


FIGURE 4-30. Typhoon Irma 270 nm south-southwest of Hong Kong 1 December 1974, 0124Z. [DMSP imagery]

### 3. TROPICAL CYCLONE CENTER FIX DATA

#### a. Discussion of Data:

The fix data computer print-out includes all sources of fix data for each tropical cyclone. Regardless of the type of fix, the first four columns of the print-out list the same information as follows:

- FIX NO. - Fixes are numbered sequentially.
- TIME - In day, hour and minutes (Zulu Time) of fix.
- POSIT - Position of storm center in degrees and tenths.
- FIXCAT - Type of fix used (SAT-satellite, P-aircraft penetration, LRDR-land radar, AC R-aircraft radar, SRDR-ship radar, CPA-station experiencing center passage, SCF-synoptic chart fix).

The format of the remainder of the print-out varies with the type of fix.

(1) **SATELLITE** - The primary satellite fix data was obtained from the various DMSP sites (Chapter II). Additional fix data was obtained from FLEWEAFAC and NESS, Suitland, Maryland (NOAA-2 prior to 16 Oct 1974, NOAA-3 from 16 Oct 74 to 17 Dec 1974, and NOAA-4 after 17 Dec 1974). Intensity estimates and trends (when available) are listed using the NESS classification system. If the source was DMSP data, the Position Code Number (PCN) appears followed by the acronym DMSP. If the source was NOAA-2, NOAA-3, or NOAA-4 data, the acronym NON DMSP appears followed by the type of satellite utilized and the CONF Number.

(2) **RADAR** - The latitude and longitude of radar site is given in the POSIT OF RADAR column. If available, plain language remarks appear after AC&W radar reports regarding tropical cyclone characteristics, size and accuracy of fix. All other land radar contain a 5-digit code group (if available) identical to the WMO radar code for reporting tropical cyclone characteristics with regard to size, development, and accuracy of location of the center or eye. A list of those land radar sites providing data in the fix print-out is given in Table 4-8.

(3) **AIRCRAFT PENETRATION** - This data was normally obtained at scheduled fix times. Additional reconnaissance aircraft fixes are sometimes made during peripheral data gathering legs between scheduled fixes. These additional fixes normally provide date, time, and position data only.

The categories containing information from reconnaissance aircraft are:

#### (a) ACCRI (Accuracy)

The estimated navigation (first number) and meteorological (second number) accuracies are expressed in nautical miles.

#### (b) FIX LVL (Fix Level)

A constant-pressure-surface flight level (listed in millibars) is normally maintained during a tropical cyclone fix mission. Low-level missions (1500 feet) are conducted at a constant, true altitude.

#### (c) MAX OBS FLT LVL WIND

Wind speed (kt) at flight level is measured by the AN/APN 147 doppler radar system aboard the WC-130 aircraft. Values entered in this category represent the maximum wind measured prior to obtaining a scheduled fix. This measurement may not represent the maximum wind because the aircraft samples only those portions of the central core region along the flight path. For this reason, the observed maximum wind may be significantly lower than the true maximum wind in the circulation (e.g., penetration through weak semicircle on first fix).

A limitation of the doppler radar system occasionally prevents the measurement of the maximum wind in intense typhoons. In areas of heavy rainfall, the radar may track energy reflected from precipitation rather than the sea surface, preventing accurate wind measurement. In these cases the wind speed will not be reported. Also, the doppler radar mount on the WC-130 restricts wind measurements to drift angles <27° if wind is normal to aircraft heading.

#### (d) MAX OBS SFC WIND

The maximum surface wind (knots) estimated from flight level is entered in this column. The observation is an estimate based on sea state. The sampling limitation noted in paragraph (c) also pertains to this category. In addition, availability of this data is dependent on the absence of under-cast conditions. The position of maximum flight level winds and maximum observed surface winds do not necessarily coincide.

#### (e) OBS MIN SLP

The minimum observed sea level pressure is normally obtained from a dropsonde released in the vortex center. If the ocean surface is visible, the dropsonde will be released over the center of the area of calm seas; otherwise it is released over a center determined by flight level winds. If the fix is made at 1500 feet, the sea level pressure is extrapolated from that level.

#### (f) MIN 700 MB HT

The minimum height of the 700 mb surface in the vortex center is recorded in decameters.

#### (g) FLT LVL TI/TO

Denotes maximum temperatures measured in the center (TI) and ambient temperature outside the center (TO). Ambient temperature is measured just prior to entering the wall cloud. Both temperature observations are in degrees Celsius and are made at flight level.

Reconnaissance aircraft seldom penetrate on the same azimuth from one fix to another. Thus, the position of TO normally varies from the center, both in bearing and range. This position is dependent on radar definition of the storm.

(h) EYE FORM/ORIENTATION/DIA

The shape and diameter (nautical miles) of the eye are determined by radar. This is reported only if the center is 50% or more surrounded by wall cloud. The orientation of the major axis concerns elliptical eyes. Abbreviations for the eye forms are as follows:

CIRC - Circular  
ELIP - Elliptical  
CONC - Concentric

TABLE 4-8. LAND RADAR SITES

<u>Location</u>	<u>Station No.</u>	<u>ICAO</u>	<u>Station Name</u>
14.2N 122.0E	98440	RPUD	DAET
14.6N 121.0E	98425		MANILA
16.4N 120.6E	98328	RPUB	BAGUIO
15.2N 120.5E	98327	RPMK	CLARK AB (USAF)
14.4N 122.6E			PARANAL AS (AC&W)
16.6N 120.3E			WALLACE AS (AC&W)
18.1N 120.5E			PARADES AS (AC&W)
13.6N 144.9E	91218	PGUA	ANDERSEN AFB (USAF)
26.1N 127.8E	47937		ITOKAZU
26.4N 127.8E	47931	RODN	KADENA AB (USAF)
26.2N 127.7E	47930	ROAHJ	NAHA AB (JASDF)
24.8N 125.3E	47927	ROMY	MIYAKOJIMA
24.3N 124.2E	47918	ROIG	ISHIGAKIJIMA
28.4N 129.5E	47909		NAZE
33.3N 134.2E	47899		MUROTOMISAKI
30.6N 131.0E	47869		TANEGASHIMA/NAKA
33.6N 130.5E	47808	RJFFJ	FUKUOKA/ITAZUKE (JASDF)
33.4N 130.4E	47806		FUKUOKA/SEFURISAN
34.3N 132.6E	47792		HIROSHIMA/HAIGAMINE
35.5N 133.1E	47791		MATSUE/MISAKAYAWA
35.8N 139.4E	47643	RJTJJ	IRUMA AB (JASDF)
35.7N 139.3E	47642	RJTY	YOKOTA AB (USAF)
35.4N 138.7E	47639		FUJISAN
35.2N 137.0E	47636		NAGOYA
33.2N 126.3E	47187	RKPM	CHEJU-DO/MOSLUPO AB
24.3N 120.6E	46770	RCQM	CCK AB/TAIWAN (USAF)
24.0N 121.6E	46763	RCYU	HUA-LIEN
22.6N 120.3E	46744		KAHHSIUNG
24.0N 121.6E	46699		HWALIEN
22.3N 114.2E	45005		HONG KONG OBSR.



# b. FIX DATA PRINTOUTS;

## TROPICAL STORM WANDA FIX POSITIONS FOR CYCLONE NO. 1 0000Z 10 JAN TO 1200Z 13 JAN

FIX NO.	TIME	POSIT	FIX ACCRY CAT NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG HNG	MAX OBS SFC WIND VEL BRG HNG	UBS MIN SLP	MIN 700MB	FLI LVL 11/10	EYE FORM	UNLEN- TATION	EYE DIA	POSIT UP HAUAH	MSN NMHM
1	060120Z	7.0N 128.3E	SAT	(11.5/1.5 /00.5/24HRS)		NOAA-2			(CONF 03)					
2	082126Z	7.4N 128.7E	SAT	(11.5/1.5 /0 / HRS)		PCN 5 DMSP								
3	090015Z	8.1N 129.1E	SAT	(13.0/3.0 /01.0/24HRS)		NOAA-2			(CONF 01)					
4	090016Z	8.0N 129.0E	SAT	(12.0/2.0 /01.0/24HRS)		NOAA-2			(CONF 02)					
5	090339Z	8.0N 129.8E	SAT	(11.5/1.5 /0 / HRS)		PCN 5 DMSP								
6	091148Z	9.7N 130.2E	SAT			PCN 5 DMSP								
7	091622Z	10.0N 130.5E	SAT			PCN 5 DMSP								
8	092249Z	9.2N 131.3E	SAT	(12.0/2.0 / / HRS)		PCN 5 DMSP								
9	100110Z	11.0N 131.0E	SAT	(13.0/3.0 /5 /24HRS)		NOAA-2			(CONF 01)					
10	100111Z	11.0N 131.0E	SAT	(13.0/3.0 /01.0/24HRS)		NOAA-2			(CONF 02)					
11	100115Z	10.0N 131.0E	P	- 15 700 270 55 170	45 55 170	45 998	305	14	-	-	-	-		
12	100325Z	9.9N 132.2E	SAT	(12.0/2.0 /00.5/24HRS)		PCN 3 DMSP								
13	100325Z	10.0N 132.1E	SAT	(12.0/2.0 / / HRS)		PCN 3 DMSP								
14	100415Z	10.3N 131.9E	P	2 15 700 270 55 190	40 60 180	40 992	302	14	-	-	-	-		
15	101131Z	10.8N 133.0E	SAT			PCN 5 DMSP								
16	101131Z	10.8N 133.0E	SAT			PCN 5 DMSP								
17	101535Z	11.5N 131.5E	AC R											
18	101608Z	11.8N 132.0E	SAT			PCN 5 DMSP								
19	101608Z	11.3N 131.8E	SAT	(IN DATA)		PCN 5 DMSP								
20	110010Z	12.5N 133.5E	SAT	(14.0/4.0 / / HRS)		NOAA-2								
21	110012Z	12.0N 133.8E	SAT	(13.0/3.0 /01.0/24HRS)		PCN 5 DMSP								
22	110012Z	12.9N 133.5E	SAT	(13.5/3.5 /01.5/24HRS)		PCN 3 DMSP								
23	110012Z	12.7N 133.9E	SAT	(13.0/3.0 /02.0/ HRS)		PCN 5 DMSP								
24	110310Z	13.3N 133.9E	SAT	(13.0/3.0 / /24HRS)		PCN 3 DMSP								
25	110310Z	13.0N 133.9E	SAT	(13.5/3.5 / / HRS)		PCN 5 DMSP								
26	110430Z	12.5N 133.9E	P	5 20 1500 - - -	- 25 120	30 996	-	25	-	-	-	-		
27	111532Z	12.0N 136.8E	SAT			PCN 3 DMSP								
28	112213Z	13.4N 137.8E	SAT	(13.0/3.0 / /24HRS)		PCN 3 DMSP								
29	112309Z	14.0N 138.0E	SAT	(12.0/3.0 /02.0/24HRS)		NOAA-2			(CONF 02)					
30	112309Z	14.0N 137.8E	SAT	(12.0/3.0 /02.0/24HRS)		NOAA-2			(CONF 01)					
31	112354Z	13.5N 138.0E	SAT	(12.0/2.0 /01.0/24HRS)		PCN 5 DMSP								
32	112354Z	13.7N 138.2E	SAT	(12.0/2.0 /01.5/24HRS)		PCN 3 DMSP								
33	120047Z	13.7N 138.1E	P	5 10 700 160 30 100	120 30 00	40 999	308	12	-	-	-	-		
34	120255Z	13.5N 138.3E	SAT	(12.0/2.0 /01.0/24HRS)		PCN 5 DMSP								
35	120255Z	13.5N 138.6E	SAT	(12.0/2.0 /01.5/ HRS)		PCN 5 DMSP								
36	120255Z	13.4N 138.0E	SAT	(11.5/1.5 / / HRS)		PCN 5 DMSP								
37	120310Z	14.0N 138.3E	P	5 10 1500 - - -	- - -	499	-	25	-	-	-	-		
38	120900Z	14.5N 139.3E	P	10 10 700 120 35 120	60 35 330	15 993	303	12	13	-	-	-		
39	121054Z	14.6N 139.8E	SAT			PCN 5 DMSP								
40	121054Z	14.1N 139.5E	SAT			PCN 5 DMSP								
41	121539Z	14.6N 140.4E	SAT			PCN 5 DMSP								
42	121539Z	14.7N 141.1E	SAT			PCN 5 DMSP								
43	121539Z	15.5N 141.3E	SAT			PCN 5 DMSP								
44	122154Z	15.0N 141.7E	SAT	(12.0/2.0 /01.0/24HRS)		PCN 5 DMSP								
45	122158Z	14.8N 142.2E	P	5 10 1500 360 35 320	70 30 20	50 998	-	26	-	-	-	-		
46	122336Z	14.4N 142.0E	SAT	(12.0/2.0 /5 /24HRS)		PCN 3 DMSP								
47	122336Z	15.0N 142.0E	SAT	(12.0/2.0 /5 /24HRS)		PCN 5 DMSP								
48	130000Z	17.5N 145.0E	SAT	(12.0/2.0 /5 /24HRS)		NOAA-2			(CONF 01)					
49	130241Z	14.8N 143.0E	SAT	(12.0/2.0 /5 /24HRS)		PCN 3 DMSP								
50	130241Z	14.8N 143.0E	SAT	(12.0/2.0 /5 / HRS)		PCN 5 DMSP								
51	130241Z	14.7N 143.1E	SAT	(11.5/1.5 /0 /24HRS)		PCN 5 DMSP								
52	130815Z	15.9N 145.6E	P	1 5 1500 40 30 320	30 20 140	34 1003	-	26	-	-	-	-		

## TROPICAL STORM AMY FIX POSITIONS FOR CYCLONE NO. 2 1200Z 14 MAR TO 1200Z 19 MAR

FIX NO.	TIME	POSIT	FIX ACCRY CAT NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG HNG	MAX OBS SFC WIND VEL BRG HNG	UBS MIN SLP	MIN 700MB	FLI LVL 11/10	EYE FORM	UNLEN- TATION	EYE DIA	POSIT UP HAUAH	MSN NMHM
1	122235Z	8.2N 145.4E	SAT	(IN DATA)										
2	132217Z	8.1N 143.2E	SAT	(11.0/1.0 /01.0/24HRS)		PCN 4 DMSP								
3	141059Z	8.3N 142.4E	SAT			PCN 3 DMSP								
4	142340Z	8.7N 142.1E	SAT	(11.5/1.5 /00.5/24HRS)		PCN 5 DMSP								
5	150043Z	8.8N 138.7E	SAT	(12.0/2.0 /01.0/24HRS)		NOAA-2			(CONF 01)					
6	151040Z	9.1N 141.2E	SAT			PCN 5 DMSP								
7	152422Z	10.3N 137.0E	SAT	(12.0/2.0 /00.5/24HRS)		PCN 5 DMSP								
8	152330Z	10.7N 137.0E	SAT	(12.5/2.5 /00.5/24HRS)		NOAA-2			(CONF 01)					
9	161112Z	11.4N 136.5E	P	- 700 - - -	- - -	996	305	-	-	-	-	-		
10	161204Z	11.7N 136.2E	SAT			PCN 5 DMSP								
11	161410Z	11.7N 136.3E	P	5 10 700 290 25 200	20 - -	1001	308	9	9	-	-	-		
12	162344Z	13.1N 138.8E	SAT	(12.5/2.5 /00.5/24HRS)		PCN 3 DMSP			(CONF 01)					
13	170022Z	14.0N 136.9E	SAT	(13.0/3.0 /00.5/24HRS)		NOAA-2								
14	170425Z	14.0N 137.2E	P	5 3 1500 180 50 140	90 30 240	12 990	-	24	-	-	-	-		
15	170905Z	14.9N 137.0E	P	5 5 1500 40 35 320	60 3 20	50 992	-	24	-	-	-	-		
16	171145Z	15.9N 138.3E	SAT			PCN 6 DMSP								
17	171513Z	15.6N 138.9E	P	3 5 700 210 52 110	120 - -	996	304	12	10	-	-	-		
18	172246Z	17.4N 140.0E	SAT	(12.5/2.5 /5 /24HRS)		PCN 5 DMSP								
19	172246Z	17.0N 140.1E	SAT	(12.0/2.0 / / HRS)		PCN 5 DMSP								
20	172321Z	17.7N 140.5E	SAT	(13.0/3.0 /5 /24HRS)		NOAA-2			(CONF 01)					
21	180143Z	17.4N 140.1E	SAT	(12.0/2.0 / / HRS)		PCN 3 DMSP								
22	180314Z	17.8N 141.1E	P	5 8 1500 20 50 340	50 3 330	30 995	-	22	-	-	-	-		
23	181127Z	19.3N 143.8E	SAT			PCN 5 DMSP								
24	181535Z	19.4N 144.5E	P	20 10 700 80 35 40	45 - -	987	298	12	11	-	-	-		
25	182030Z	21.0N 146.4E	P	20 10 700 310 40	- 60 240	10 -	-	17	15	-	-	-		
26	182222Z	22.9N 149.0E	SAT	(12.0/3.0 /01.0/24HRS)		NOAA-2			(CONF 02)					
27	182227Z	22.1N 149.1E	SAT	(13.0/3.0 /00.5/24HRS)		PCN 3 DMSP								
28	190045Z	23.5N 151.0E	P	5 5 1500 - - -	- 3 280	25 993	-	20	-	-	-	-		
29	190815Z	23.0N 151.0E	P	- 1500 - - -	- - -	993	-	-	-	-	-	-		
30	190912Z	24.3N 151.7E	P	5 2 1500 270 30 -	- - -	-	166	13	-	-	-	-		

TROPICAL STORM BASE  
FIX POSITIONS FOR CYCLONE NO. 3  
0000Z 26 APR TO 0600Z 02 MAY

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	FLT DIR	MAX OBS LVL	WIND BRG	MAX OBS SFC WIND VEL	WIND BRG	OBS MIN SLP	MIN T1/T0	FLT LVL	EYE FORM	ORIENT	EYE DIA	POSIT OF RADAR	MSN NMBR
1	232143Z	1.8N 153.8E	SAT				(11.5/1.5 / 00.5/24HRS)		NOAA-2								(CONF 02)	
2	242151Z	6.3N 156.3E	SAT				(11.5/1.5 / 24HRS)		NOAA-2								(CONF 01)	
3	250148Z	7.4N 152.6E	SAT				(11.5/1.5 / 00.5/24HRS)		PCN 5 DMSP									
4	251003Z	9.3N 149.5E	SAT						PCN 6 DMSP									
5	251429Z	9.3N 149.3E	SAT						PCN 6 DMSP									
6	252245Z	11.4N 148.4E	SAT				(12.0/2.0 / 00.5/24HRS)		PCN 5 DMSP									
7	252259Z	11.0N 148.7E	SAT				(12.0/2.0 / 00.5/24HRS)		NOAA-2								(CONF 02)	
8	252301Z	9.2N 147.5E	P	10	20	1500	80	20 350	20	20 350	90	1002	-	22	22	-	-	1
9	260129Z	11.6N 147.6E	SAT				(12.0/2.0 / 00.5/24HRS)		PCN 5 DMSP									
10	260320Z	9.9N 146.9E	P	5	10	1500	190	25 110	100	15	-	1001	-	22	-	-	-	1
11	260835Z	10.9N 146.1E	P	5	10	700	40	30 320	80	15 340	120	1002	309	11	10	-	-	2
12	261127Z	12.4N 145.8E	SAT						PCN 6 DMSP									
13	261318Z	11.7N 145.8E	P	7	5	700	350	35 290	50	-	-	1002	309	12	10	-	-	2
14	261410Z	12.5N 145.6E	SAT						PCN 6 DMSP									
15	261519Z	11.9N 145.4E	P	7	5	700	90	30 360	40	-	-	999	307	12	10	-	-	2
16	261820Z	12.2N 145.5E	P	5	6	700	320	30 280	48	-	-	990	306	12	-	-	-	3
17	262104Z	12.2N 145.5E	P	5	1	700	210	30 160	60	20 90	10	998	308	13	-	-	-	3
18	262145Z	12.1N 145.3E	LHUR				- POSSIBLE CENTER, 15		DEG SPIRAL OVERLAY, NEG. WALL CLOUD								13.6N 144.9E	
19	262214Z	12.2N 144.2E	SAT				(12.5/2.5 / / HRS)		NOAA-2									
20	262226Z	12.4N 145.3E	SAT				(13.0/3.0 / 01.0/24HRS)		PCN 3 DMSP									
21	262226Z	12.6N 145.4E	SAT				(12.0/2.0 / 5 HRS)		PCN 3 DMSP									
22	270005Z	12.6N 145.3E	P	5	5	1500	110	25 360	70	20 270	10	1001	-	24	-	-	-	3
23	270111Z	12.7N 145.4E	SAT				(13.0/3.0 / 01.0/24HRS)		PCN 3 DMSP									
24	270540Z	13.5N 145.3E	LHUR				- POSSIBLE CENTER, 70		DEG SPIRAL OVERLAY, WALL CLOUD FORMING ALL QUADS								13.6N 144.9E	
25	270610Z	13.5N 145.5E	LHUR				- ELLIP EYE 34x16, OPEN NE										13.6N 144.9E	
26	270835Z	13.6N 145.6E	P	5	3	700	180	20 90	10	25 240	10	996	306	12	9	-	-	4
27	271108Z	14.3N 146.4E	SAT						PCN 6 DMSP									
28	271240Z	13.8N 145.9E	LHUR				- POSSIBLE CENTER, 15		DEG SPIRAL OVERLAY, WALL CLOUD 5-W-NW								13.6N 144.9E	
29	271342Z	14.5N 145.8E	P	4	8	700	280	40 220	180	-	-	-	10	9	-	-	-	4
30	272208Z	15.9N 145.9E	SAT				(12.0/3.0 / 01.0/24HRS)		PCN 5 DMSP									
31	272322Z	15.5N 145.5E	SAT				(12.0/2.5 / 00.5/24HRS)		NOAA-2								(CONF 01)	
32	280052Z	16.1N 145.6E	SAT				(12.0/3.0 / 01.0/24HRS)		PCN 5 DMSP									
33	280325Z	16.1N 145.6E	P	2	5	700	80	23 350	25	25 160	35	995	303	14	-	-	-	5
34	280925Z	16.5N 145.6E	P	2	10	700	300	25 210	30	20 10	95	996	306	13	-	-	-	5
35	281050Z	17.0N 145.4E	SAT						PCN 6 DMSP									
36	281333Z	17.7N 145.7E	SAT						PCN 4 DMSP									
37	281435Z	17.4N 145.7E	P	5	10	700	360	20 270	35	-	-	995	305	13	-	-	-	5
38	282150Z	18.0N 144.9E	SAT				(13.5/3.5 / 01.5/24HRS)		PCN 3 DMSP									
39	282150Z	17.6N 145.2E	SAT				(13.5/3.5 / 01.5/48HRS)		PCN 3 DMSP									
40	282158Z	17.8N 145.1E	P	20	2	700	320	25 250	30	25 230	200	-	307	10	10	-	-	6
41	282239Z	17.8N 145.2E	SAT				(14.0/4.0 / 02.0/24HRS)		NOAA-2								(CONF 01)	
42	282332Z	18.1N 145.0E	SAT				(13.5/3.5 / 01.5/24HRS)		PCN 3 DMSP									
43	290215Z	18.4N 145.1E	SAT				(13.5/3.5 / 01.5/24HRS)		PCN 3 DMSP									
44	290215Z	18.5N 144.9E	SAT				(13.5/3.5 / 01.5/48HRS)		PCN 3 DMSP									
45	290753Z	18.8N 145.2E	P	5	5	700	260	40 210	40	25 20	25	997	305	14	12	-	-	7
46	291032Z	18.9N 144.3E	SAT						PCN 3 DMSP									
47	291032Z	19.0N 144.2E	SAT						PCN 6 DMSP									
48	291443Z	19.7N 145.3E	P	5	5	700	180	55 90	40	-	-	985	297	16	13	-	-	7
49	291456Z	19.2N 144.7E	SAT						PCN 5 DMSP									
50	291456Z	19.3N 145.0E	SAT						PCN 3 DMSP									
51	292313Z	20.3N 145.0E	SAT				(13.5/3.5 / 5 / 24HRS)		PCN 1 DMSP									
52	292313Z	20.1N 144.8E	SAT				(14.0/4.0 / 00.5/24HRS)		PCN 1 DMSP									
53	292345Z	20.0N 145.0E	SAT				(12.0/2.5 / 01.0/24HRS)		NOAA-2								(CONF 02)	
54	300157Z	20.5N 144.8E	SAT				(13.5/3.5 / 5 / 24HRS)		PCN 1 DMSP									
55	300157Z	20.3N 144.6E	SAT				(14.0/4.0 / 00.5/24HRS)		PCN 1 DMSP									
56	300404Z	20.3N 144.3E	P	2	2	1500	330	35 240	20	40 240	20	983	-	25	-	-	-	8
57	300415Z	21.3N 144.3E	P	5	5	700	320	75 250	35	5 20	50	983	295	15	-	-	-	8
58	301155Z	21.4N 144.9E	SAT						PCN 3 DMSP									
59	301437Z	21.7N 145.2E	SAT						PCN 3 DMSP									
60	301510Z	22.1N 144.9E	P	10	10	700	270	70 180	50	-	-	292	10	17	-	-	-	9
61	302255Z	22.0N 146.3E	SAT				(13.0/3.5 / 00.5/24HRS)		PCN 3 DMSP									
62	010138Z	23.2N 146.9E	SAT				(13.0/3.5 / 00.5/24HRS)		PCN 3 DMSP									
63	010250Z	23.6N 146.1E	P	10	5	700	250	75 180	30	70 180	60	984	293	14	10	-	-	9
64	010820Z	25.2N 147.0E	P	10	5	700	290	50 200	35	30 240	35	983	294	10	13	-	-	10
65	011137Z	26.1N 147.3E	SAT						PCN 3 DMSP									
66	011419Z	26.5N 148.0E	SAT						PCN 3 DMSP									
67	012216Z	28.0N 151.0E	SAT				(13.0/3.0 / 02.0/48HRS)		NOAA-2								(CONF 01)	
68	012237Z	30.0N 151.2E	SAT				(12.0/3.0 / 01.0/24HRS)		PCN 3 DMSP									
69	012237Z	30.0N 151.2E	SAT				(12.0/2.5 / 00.5/ HRS)		PCN 3 DMSP									
70	012315Z	30.0N 151.2E	P	10	10	700	-	-	-	70 230	120	994	301	13	-	-	-	11
71	020119Z	31.0N 152.7E	SAT				(12.0/3.0 / 01.0/24HRS)		PCN 3 DMSP									
72	020120Z	30.9N 152.9E	SAT				(12.0/2.5 / 00.5/ HRS)		PCN 3 DMSP									
73	021119Z	29.4N 157.0E	SAT						PCN 6 DMSP									

TYPHOON CARLA  
FIX POSITIONS FOR CYCLONE NO. 4  
0000Z 02 MAY TO 0600Z 07 MAY

FIX NO.	TIME	PUSIT	FIX CAT	ACCRY NAV-MET	FIX LVL	MAX OBS FLT LVL DIR VEL BRG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN 700MB HGT	FLT LVL TI/10	EYE FORM	UNION-TATION	EYE DIA	PUSIT OF RADAR	MSN NMHM
1	282150Z	5.0N 158.4E	SAT			(T1.5/1.5 /D0.5/24HRS)	PCN 3 DMSP								
2	291315Z	5.5N 157.6E	SAT			(T1.5/1.5 /S /24HRS)	PCN 6 DMSP								
3	292132Z	6.0N 156.6E	SAT			(T2.0/2.0 /D1.0/24HRS)	PCN 6 UMSP								
4	302108Z	8.0N 156.0E	SAT			(T1.5/1.5 /S /24HRS)	NOAA-2				(CONF 03)				
5	302255Z	8.1N 155.0E	SAT			(T1.5/1.5 /S /24HRS)	PCN 5 DMSP								
6	010138Z	9.0N 154.5E	SAT			(T1.5/1.5 /S /24HRS)	PCN 5 DMSP								
7	010955Z	9.8N 152.3E	SAT				PCN 6 DMSP								
8	011419Z	10.4N 151.6E	SAT				PCN 5 DMSP								
9	011419Z	10.5N 151.5E	SAT			IR DATA	PCN 6 DMSP								
10	012221Z	12.2N 150.3E	SAT			(T2.0/2.0 /S /24HRS)	NOAA-2				(CONF 01)				
11	012237Z	11.9N 150.3E	SAT			(T2.0/2.0 /D0.5/24HRS)	PCN 3 DMSP								
12	020119Z	12.5N 149.9E	SAT			(T2.0/2.0 /D0.5/24HRS)	PCN 3 DMSP								
13	020435Z	12.6N 149.2E	P	5	5	1500 180 45 90	15 37 90	15	998	-	25	-	-	-	1
14	020930Z	12.8N 148.3E	P	5	5	700 90 50 10	60 3 10	60	-	306	11	-	-	-	1
15	021119Z	13.0N 148.4E	SAT				PCN 3 DMSP								
16	021119Z	12.9N 147.8E	SAT			IR DATA	PCN 4 DMSP								
17	021401Z	13.4N 147.6E	SAT				PCN 3 DMSP								
18	021401Z	13.4N 146.9E	SAT				PCN 4 DMSP								
19	021435Z	13.4N 147.4E	P	-	5	700 340 35 250	15 - -	-	996	306	15 11	-	-	-	2
20	021620Z	13.4N 147.5E	P	-	-	700 - -	- - -	-	-	-	-	-	-	-	2
21	021818Z	13.6N 147.3E	P	10	5	700 320 30 -	- - -	-	992	301	13 -	-	-	-	3
22	022103Z	14.0N 147.1E	P	5	5	700 130 60 30	35 50 -	-	988	299	15 8	-	-	-	3
23	022219Z	13.9N 147.0E	SAT			(T3.5/3.5 /D1.5/24HRS)	PCN 3 DMSP								
24	022219Z	14.2N 147.2E	SAT			(T3.0/3.0 /S /24HRS)	PCN 3 UMSP								
25	022326Z	13.7N 146.2E	SAT			(T3.5/3.5 /D1.5/24HRS)	NOAA-2				(CONF 01)				
26	030101Z	14.1N 146.3E	SAT			(T3.5/3.5 /D1.5/24HRS)	PCN 3 DMSP								
27	030351Z	14.5N 146.2E	P	5	10	700 260 28 170	25 40 170	45	991	301	14 9	-	-	-	3
28	030843Z	15.1N 145.5E	P	2	5	700 290 35 220	50 3 220	45	994	304	12 8	-	-	-	4
29	031100Z	15.5N 145.1E	SAT				PCN 3 DMSP								
30	031100Z	14.9N 144.8E	SAT				PCN 4 DMSP								
31	031342Z	15.5N 144.6E	SAT				PCN 3 DMSP								
32	031447Z	15.6N 144.9E	P	2	5	700 120 45 70	35 - -	-	989	301	13 12	-	-	-	4
33	032200Z	16.1N 144.1E	SAT			(T3.5/3.5 /S /24HRS)	PCN 3 DMSP								
34	032200Z	15.7N 144.2E	SAT			(T3.0/3.0 /S /24HRS)	PCN 3 DMSP								
35	032243Z	16.1N 144.6E	SAT			(T4.5/4.5 /D1.0/24HRS)	NOAA-2				(CONF 01)				
36	040224Z	16.6N 144.2E	SAT			(T3.5/3.5 /S /24HRS)	PCN 1 DMSP								
37	040224Z	16.1N 144.2E	SAT			(T5.0/5.0 / /HRS)	PCN 1 DMSP								
38	040330Z	16.3N 144.2E	P	5	5	700 320 35 230	30 5 250	10	978	291	15 10	-	-	-	5
39	040830Z	17.0N 143.9E	P	5	5	700 150 60 130	60 50 60	12	973	285	17 13	CTRC	-	25	5
40	041041Z	17.1N 143.7E	SAT				PCN 1 DMSP								
41	041042Z	17.3N 143.5E	SAT				PCN 2 DMSP								
42	041505Z	17.5N 143.9E	SAT				PCN 1 DMSP								
43	041505Z	17.5N 143.9E	SAT				PCN 1 DMSP								
44	042048Z	18.1N 143.7E	P	3	3	700 280 90 220	20 90 240	15	963	278	17 12	CTRC	-	20	6
45	042324Z	18.5N 143.9E	SAT			(T4.5/4.5 /D1.0/24HRS)	PCN 1 DMSP								
46	042324Z	18.4N 144.0E	SAT			(T5.0/5.0 / /HRS)	PCN 1 DMSP								
47	042350Z	18.4N 143.9E	SAT			(T5.5/5.5 /D1.0/24HRS)	NOAA-2				(CONF 01)				
48	050206Z	19.1N 143.9E	SAT			(T4.5/4.5 /D1.0/24HRS)	PCN 1 DMSP								
49	050206Z	19.0N 143.9E	SAT			(T6.0/6.0 /D1.0/24HRS)	PCN 1 DMSP								
50	050242Z	19.1N 143.7E	P	4	3	700 280 100 280	15 100 280	15	963	278	19 12	CTRC	-	25	6
51	050850Z	20.4N 144.0E	P	5	2	700 260 80 190	35 80 240	10	965	275	23 16	CTRC	-	20	7
52	051024Z	20.3N 144.1E	SAT				PCN 1 DMSP								
53	051205Z	21.3N 144.2E	SAT				PCN 1 DMSP								
54	051446Z	21.6N 145.2E	SAT				PCN 3 DMSP								
55	051447Z	21.3N 144.9E	SAT				PCN 1 DMSP								
56	051510Z	21.4N 144.8E	P	10	2	700 330 60 240	30 - -	-	969	282	19 11	CTRC	-	20	7
57	052302Z	23.7N 145.4E	SAT			(T5.0/5.0 /W0.5/24HRS)	NOAA-2				(CONF 01)				
58	052305Z	23.7N 145.7E	SAT			(T4.5/4.5 /W /24HRS)	PCN 3 DMSP								
59	052305Z	23.4N 145.6E	SAT			(T4.5/5.5 /W1.5/21HRS)	PCN 3 DMSP								
60	060147Z	24.3N 146.0E	SAT			(T4.5/4.5 /W /24HRS)	PCN 3 DMSP								
61	060147Z	24.1N 146.0E	SAT			(T4.5/5.5 /W1.5/21HRS)	PCN 3 DMSP								
62	060421Z	25.0N 145.8E	P	10	2	700 330 50 240	10 70 00	35	983	293	14 -	-	-	-	8
63	060445Z	25.9N 147.0E	P	10	2	700 240 80 150	70 4 300	20	984	294	14 -	-	-	-	8
64	061147Z	26.8N 148.4E	SAT				PCN 3 DMSP								
65	061147Z	26.5N 148.2E	SAT				PCN 3 DMSP								
66	061428Z	27.2N 149.1E	SAT				PCN 3 DMSP								
67	061428Z	27.0N 148.8E	SAT				PCN 3 DMSP								
68	062106Z	28.8N 151.3E	SAT			(T4.5/4.5 /W /24HRS)	PCN 3 DMSP								
69	062247Z	28.9N 151.8E	SAT			(T2.5/3.5 /W2.0/24HRS)	PCN 3 DMSP								
70	062247Z	29.0N 151.8E	SAT			(T4.5/5.5 /W1.5/21HRS)	PCN 3 DMSP								
71	070128Z	29.6N 153.1E	SAT			(T2.5/3.5 /W2.0/24HRS)	PCN 3 DMSP								
72	070128Z	29.3N 153.2E	SAT			(T2.5/3.5 /W2.0/24HRS)	PCN 3 DMSP								
73	071129Z	31.2N 158.1E	SAT				PCN 3 DMSP								
74	071129Z	31.0N 158.1E	SAT				PCN 5 DMSP								

TROPICAL DEPRESSION 5  
FIX POSITIONS FOR CYCLONE NO. 5  
0600Z 07 JUN TO 0600Z 08 JUN

FIX NO.	TIME	POSIT	FIX ACCRY CAT	FIX NAV-MET LVL	FIX DIR	MAX OBS VEL	MAX OBS LVL	MAX OBS WIND BRG	MAX OBS SFC WIND VEL	MAX OBS WIND BRG	OBS SLP	MIN 700MB HGT	FLT LVL TI/TO	EYE FORM	ORIEN- TATION	EYE DIA	POSIT OF RADAR	MSN NMBR
1	060402Z	18.9N 113.5E	SAT			(11.0/1.0 /01.0/24HRS)			PCN 5	DMSP								
2	070112Z	19.9N 113.3E	SAT			(12.5/2.5 /01.5/21HRS)			PCN 3	DMSP								
3	070344Z	20.1N 112.8E	SAT			(12.5/2.5 /01.5/21HRS)			PCN 3	DMSP								
4	080325Z	21.0N 111.0E	SAT			(12.0/2.0- / / HRS)			PCN 5	DMSP								
5	080325Z	21.0N 111.3E	SAT			(12.0/2.5 /00.5/27HRS)			PCN 5	DMSP								
6	080325Z	20.6N 110.7E	SAT			(12.0/2.0 / / HRS)			PCN 5	DMSP								
7	081335Z	21.2N 109.7E	SAT						PCN 6	DMSP								
8	081606Z	20.8N 108.8E	SAT						PCN 6	DMSP								
9	081607Z	21.7N 109.5E	SAT						PCN 6	DMSP								

TYPHOON DINAH  
FIX POSITIONS FOR CYCLONE NO. 6  
0000Z 08 JUN TO 0600Z 14 JUN

FIX NO.	TIME	POSIT	FIX ACCRY CAT	FIX NAV-MET LVL	FIX DIR	MAX OBS VEL	MAX OBS LVL	MAX OBS WIND BRG	MAX OBS SFC WIND VEL	MAX OBS WIND BRG	OBS SLP	MIN 700MB HGT	FLT LVL TI/TO	EYE FORM	ORIEN- TATION	EYE DIA	POSIT OF RADAR	MSN NMBR
1	042225Z	5.5N 146.5E	SAT			(11.0/1.0 /01.0/24HRS)			PCN 5	DMSP								
2	050239Z	6.7N 144.0E	SAT			(11.0/1.0 /01.0/24HRS)			PCN 5	DMSP								
3	051107Z	7.5N 143.3E	SAT						PCN 5	DMSP								
4	051329Z	8.0N 142.7E	SAT						PCN 5	DMSP								
5	052349Z	11.4N 139.2E	SAT			(12.5/2.5 /01.5/24HRS)			PCN 3	DMSP								
6	060221Z	11.2N 138.5E	SAT			(12.5/2.5 /01.5/24HRS)			PCN 5	DMSP								
7	060559Z	10.4N 138.8E	P	5	5	1500	260	25 210	15	25 10	15	1009	-	-	26	-	-	2
8	061049Z	11.1N 137.4E	SAT						PCN 6	DMSP								
9	061230Z	11.3N 137.3E	SAT						PCN 6	DMSP								
10	061502Z	12.0N 136.6E	SAT						PCN 5	DMSP								
11	062120Z	11.6N 135.8E	P	2	1	1500	120	25 60	110	25 360	30	1001	-	24	-	-	-	3
12	062330Z	12.1N 135.9E	SAT			(11.5/2.5 /01.0/24HRS)			PCN 3	DMSP								
13	062355Z	12.0N 135.0E	SAT			(13.0/4.0 /01.0/24HRS)			NOAA-2									
14	070113Z	12.3N 135.1E	P	2	1	700	110	35 30	12	30	-	-	-	-	-	-	-	3
15	070202Z	12.5N 135.3E	SAT			(11.5/2.5 /01.0/24HRS)			PCN 5	DMSP								
16	071212Z	12.5N 132.7E	SAT						PCN 5	DMSP								
17	071444Z	12.7N 131.2E	SAT						PCN 5	DMSP								
18	072312Z	13.2N 128.4E	SAT			(12.5/2.5 /01.0/24HRS)			PCN 5	DMSP								
19	072312Z	13.1N 128.6E	SAT			(12.5/2.5 / / HRS)			PCN 5	DMSP								
20	072458Z	13.0N 128.2E	SAT			(14.0/4.0 /01.0/24HRS)			NOAA-2									
21	080114Z	13.0N 128.1E	P	15	2	1500	300	50 300	25	4 300	20	991	-	-	26	-	-	4
22	080325Z	12.8N 128.1E	SAT			(12.5/2.5 /01.0/24HRS)			PCN 3	DMSP								
23	080325Z	12.7N 128.1E	SAT			(13.0/3.0 / / HRS)			PCN 3	DMSP								
24	080330Z	13.0N 127.8E	P	15	2	1500	300	68 200	20	60 190	25	979	-	-	26	-	-	4
25	080415Z	13.4N 127.4E	P	5	2	700	130	40 80	32	50 80	42	986	300	20	-	-	-	5
26	081154Z	13.4N 126.5E	SAT						PCN 5	DMSP								
27	081435Z	13.8N 126.6E	P	5	3	700	310	40 190	85	-	-	989	300	15	-	-	-	5
28	081607Z	13.6N 125.2E	SAT						PCN 6	DMSP								
29	082146Z	14.3N 125.6E	P	5	2	700	140	40 40	60	1 40	60	989	302	20	-	-	-	6
30	090020Z	14.5N 125.0E	SAT			(14.5/4.5 / /24HRS)			NOAA-2									
31	090035Z	14.5N 125.3E	SAT			(13.5/3.5 /00.5/21HRS)			PCN 3	DMSP								
32	090307Z	14.9N 124.8E	SAT			(14.0/4.0 /01.5/28HRS)			PCN 3	DMSP								
33	091158Z	14.3N 123.4E	P	5	5	700	60	55 330	70	-	-	-	294	-	14	-	-	7
34	091317Z	14.4N 122.9E	SAT						PCN 6	DMSP								
35	091415Z	14.3N 123.5E	LNDR			- POSSIBLE EYE, 15 DEG SPIRAL OVERLAY											14.4N 122.6E	
36	091435Z	14.9N 123.5E	LNDR			- POSSIBLE EYE, 15 DEG SPIRAL OVERLAY											14.4N 120.6E	
37	091500Z	14.7N 123.2E	LNDR			- FAIR FIX, EYE NOT VISIBLE											14.4N 122.6E	
38	091506Z	14.5N 122.6E	LNDR			- GOOD FIX, 15 DEG SPIRAL OVERLAY, POSSIBLE EYE											15.2N 120.6E	
39	091523Z	14.6N 123.1E	P	5	5	700	40	70 340	525	-	-	977	291	-	15	-	-	7
40	091548Z	14.8N 122.9E	SAT						PCN 1	DMSP								
41	091548Z	14.8N 122.9E	SAT						PCN 6	DMSP								
42	091548Z	15.0N 123.3E	SAT			(IM DATA			PCN 3	DMSP								
43	091600Z	14.8N 123.0E	LNDR			- CIRCULAR EYE 14 NM											14.4N 122.6E	
44	091608Z	14.5N 122.5E	LNDR			- GOOD FIX, 90 PERCENT WALL CLOUD											15.2N 120.6E	
45	091638Z	14.6N 122.6E	LNDR			- FAIR FIX, ELLIPTICAL EYE 3 1/4 NM, 90 PERCENT WALL CLOUD											15.2N 120.6E	
46	091705Z	14.7N 122.3E	LNDR			- FAIR FIX, NEG EYE. 15 DEG SPIRAL OVERLAY											15.2N 120.6E	
47	091808Z	14.7N 122.3E	LNDR			- FAIR FIX, NEG EYE. 15 DEG SPIRAL OVERLAY											15.2N 120.6E	
48	091838Z	14.7N 122.3E	LNDR			- FAIR FIX, NEG EYE. 15 DEG SPIRAL OVERLAY											15.2N 120.6E	
49	091938Z	14.3N 122.0E	LNDR			- FAIR FIX, NEG EYE. 15 DEG SPIRAL OVERLAY											15.2N 120.6E	
50	091945Z	15.0N 122.6E	LNDR			- CIRCULAR EYE 32 NM DIAM, WALL CLOUD OPEN SOUTH											14.4N 122.6E	

TYPHOON DINAH  
FIX POSITIONS FOR CYCLONE NO. 6  
0000Z 08 JUN TO 0600Z 14 JUN

FIX NO.	TIME	POSIT	FIX CAT	ACCNY NAV-MET	FIX LVL	MAX OBS DIR VEL BRG WNG	MAX OBS SFC WIND VEL DIR WNG	OBS MIN SLP	MIN 700MB HGT	FLT LVL	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF NADAR	MSN NMHM
51	091945Z	15.1N 122.7E	LNDR	-	POSSIBLE EYE									16.4N 120.6E	
52	092000Z	15.0N 122.6E	LNDR	-	CIRCULAR EYE 30 NM DIAM, 100 PERCENT WALL CLOUD									14.4N 122.6E	
53	092038Z	15.2N 122.6E	LNDR	-	CIRCULAR EYE 26 NM DIAM									15.2N 120.6E	
54	092045Z	15.0N 122.6E	P 2	2	700 350 58 250 28	40 350 10	974	287	14	-	ELIP	SW-NE	40x20		8
55	092100Z	15.0N 122.6E	LNDR	-	CIRCULAR EYE 25 NM DIAM, 6000 FIX									14.4N 122.6E	
56	092100Z	15.2N 122.8E	LNDR	-	ELLIPTICAL EYE 45x15 NM, 90 PERCENT WALL CLOUD									16.4N 120.6E	
57	092335Z	15.5N 122.5E	LNDR	-	CIRCULAR EYE 32 NM DIAM, 80 PERCENT WALL CLOUD									14.4N 122.6E	
58	100000Z	15.6N 122.3E	LNDR	-	CIRCULAR EYE 25 NM DIAM									14.4N 122.6E	
59	100008Z	15.3N 122.3E	LNDR	-	FAIR FIX, EYE NOT VISIBLE, 15 DEG SPIRAL OVERLAY									15.2N 120.6E	
60	100017Z	15.5N 122.4E	SAT	(14.5/4.5-/D0.5/21HRS)	PCN 1	DNMP									
61	100017Z	15.4N 122.5E	SAT	(15.0/5.0-/D1.5/24HRS)	PCN 1	DNMP									
62	100017Z	15.4N 122.0E	SAT	(IR DATA)	PCN 3	DNMP									
63	100030Z	15.3N 122.5E	LNDR	-	FAIR FIX, EYE NOT VISIBLE, 15 DEG SPIRAL OVERLAY									15.2N 120.6E	
64	100108Z	15.9N 122.6E	LNDR	-	CIRCULAR EYE 20 NM DIAM									15.2N 120.6E	
65	100128Z	15.5N 122.7E	SAT	(15.0/5.0 /W0.5/25HRS)	NOAA-2	(CONF 01)									
66	100130Z	15.4N 122.6E	LNDR	-	CIRCULAR EYE 25 NM DIAM, 90 PERCENT WALL CLOUD									15.2N 120.6E	
67	100235Z	15.6N 122.2E	P 2	5	700 70 68 320 50	5 10 20	974	287	14	-	CIRC		20		8
68	100248Z	15.7N 121.6E	SAT	(14.5/4.5-/D0.5/21HRS)	PCN 1	DNMP									
69	100448Z	15.8N 121.9E	SAT	(15.0/5.0-/ / HRS)	PCN 1	DNMP									
70	100305Z	15.7N 121.8E	LNDR	-	CIRCULAR EYE 30 NM DIAM, 90 PERCENT WALL CLOUD									15.2N 120.6E	
71	100330Z	15.7N 121.8E	LNDR	-	CIRCULAR EYE 30 NM DIAM, 90 PERCENT WALL CLOUD									15.2N 120.6E	
72	100400Z	15.8N 121.9E	LNDR	-	CIRCULAR EYE 20 NM DIAM, 100 PERCENT WALL CLOUD									16.4N 120.6E	
73	100500Z	16.0N 121.8E	LNDR	-	CIRCULAR EYE 20 NM DIAM, 100 PERCENT WALL CLOUD									16.4N 120.6E	
74	100700Z	16.2N 120.8E	LNDR	-	POSSIBLE EYE 15 DEG SPIRAL OVERLAY									16.4N 120.3E	
75	100931Z	16.4N 120.4E	LNDR	-	POOR FIX, POSSIBLE EYE, 15 DEG SPIRAL OVERLAY									15.2N 120.6E	
76	101005Z	16.5N 120.3E	LNDR	-	POOR FIX, POSSIBLE EYE, 15 DEG SPIRAL OVERLAY									15.2N 120.6E	
77	101035Z	16.6N 120.1E	LNDR	-	POOR FIX, POSSIBLE EYE, 15 DEG SPIRAL OVERLAY									16.4N 120.3E	
78	101100Z	17.3N 119.9E	LNDR	-	POOR FIX, POSSIBLE CENTER, 15 DEG SPIRAL OVERLAY									15.2N 120.6E	
79	101200Z	17.0N 120.0E	LNDR	-	1035/										
80	101259Z	16.8N 119.6E	SAT			PCN 3	DNMP								
81	101259Z	16.6N 119.2E	SAT			PCN 2	DNMP								
82	101329Z	17.4N 118.5E	SAT			PCN 3	DNMP								
83	101530Z	17.8N 119.0E	SAT			PCN 6	DNMP								
84	102227Z	16.3N 118.0E	P 15	8	700 - - -	-	50 20	90	986	297	13	-	-	-	9
85	102359Z	16.8N 116.8E	SAT	(12.5/3.5-/W1.0/24HRS)	PCN 3	DNMP									
86	102359Z	16.7N 117.6E	SAT	(14.0/4.0-/W1.0/24HRS)	PCN 3	DNMP									
87	102359Z	16.2N 117.6E	SAT	(13.0/4.0 /W2.0/21HRS)	PCN 3	DNMP									
88	110335Z	16.5N 117.1E	P 10	5	700 - - -	-	50 60	120	-	295	12	-	-	-	9
89	110409Z	16.8N 117.2E	SAT	(14.0/4.0-/W1.0/24HRS)	PCN 3	DNMP									
90	110455Z	16.5N 116.7E	P 8	5	700 180 60 110	120	60 110	120	978	293	18	-	-	-	11
91	111240Z	16.9N 116.1E	SAT			PCN 4	DNMP								
92	111240Z	16.7N 115.6E	SAT			PCN 4	DNMP								
93	111550Z	16.6N 115.0E	P 3	7	700 120 40 200	150	-	-	-	290	13	-	-	-	12
94	111653Z	16.7N 115.3E	SAT			PCN 6	DNMP								
95	112050Z	17.0N 113.8E	P 10	30	500 170 80 90	100	60 90	80	978	-	-	-	-	-	12
96	120122Z	17.1N 113.9E	SAT	(14.0/4.0 /S /24HRS)	PCN 3	DNMP									
97	120124Z	17.7N 114.4E	SAT	(14.5/4.5 /D0.5/24HRS)	PCN 1	DNMP									
98	120152Z	17.5N 115.5E	SAT	(14.5/4.5 /W0.5/24HRS)	NOAA-2	(CONF 01)									
99	120322Z	17.5N 114.1E	SAT	(14.0/4.0 /S /24HRS)	PCN 3	DNMP									
100	120415Z	18.5N 113.6E	P 5	5	700 80 80 70	40	15 70	80	-	288	14	-	-	-	13
101	121030Z	18.6N 113.0E	P 5	3	700 - - -	-	-	-	-	289	14	-	CIRC	10	13
102	121633Z	19.6N 111.6E	SAT			PCN 4	DNMP								
103	130104Z	20.0N 110.4E	SAT	(14.0/4.0-/S /24HRS)	PCN 4	DNMP									
104	130106Z	20.2N 110.8E	SAT	(14.0/4.0 /S /24HRS)	NOAA-2	(CONF 01)									
105	130334Z	20.1N 109.3E	SAT	(14.0/4.0-/S /24HRS)	PCN 3	DNMP									
106	130334Z	19.9N 109.5E	SAT	(13.5/3.5 / / HRS)	PCN 3	DNMP									
107	131345Z	20.3N 108.1E	SAT			PCN 4	DNMP								
108	131615Z	20.8N 107.5E	SAT			PCN 3	DNMP								
109	140046Z	20.1N 105.3E	SAT	(IR DATA)		PCN 5	DNMP								

TROPICAL STORM EMMA  
FIX POSITIONS FOR CYCLONE NO. 7  
0600Z 13 JUN TO 0600Z 18 JUN

FIX NO.	TIME	PUSIT	FIX CAT	ACCNY NAV-MET	FIX LVL	MAX OBS FLT LVL DIR VEL BRG RNG	MAX OBS SFC WIND VEL DHG RNG	OBS MIN SLP	MIN 700MB MGT	FLT LVL TI/TO	EYE FORM	ORIEN- TATION	EYE DIA	PUSIT OF RADAR	MSN NMH
1	100107Z	2.0N 149.0E	SAT			(T1.0/1.0 /D1.0/21HRS)	PCN 5 UMSP								
2	101117Z	3.1N 147.4E	SAT				PCN 6 UMSP								
3	101348Z	3.8N 147.3E	SAT				PCN 5 UMSP								
4	102217Z	4.2N 147.0E	SAT			(T1.5/1.5 /D0.5/21HRS)	PCN 5 UMSP								
5	110230Z	5.4N 144.0E	SAT			(T1.5/1.5 /D0.5/21HRS)	PCN 5 UMSP								
6	111059Z	6.3N 143.2E	SAT				PCN 5 UMSP								
7	112341Z	8.0N 142.0E	SAT			(T1.5/1.5 /S /25HRS)	PCN 5 UMSP								
8	120211Z	8.5N 141.7E	SAT			(T1.5/1.5 /S /25HRS)	PCN 3 UMSP								
9	121452Z	10.8N 137.9E	SAT				PCN 5 UMSP								
10	122313Z	12.3N 136.8E	SAT			(T2.5/2.5 /D0.5/25HRS)	NOAA-2			(CONF 01)					
11	122322Z	11.4N 136.3E	SAT			(T2.5/2.5 /D1.0/24HRS)	PCN 5 UMSP								
12	122322Z	12.4N 136.4E	SAT			(T3.0/3.0 / /HRS)	PCN 3 UMSP								
13	130143Z	11.2N 135.7E	P	10	2	1500 140 27 50	13 30 50	13	1001	-	26 25	-	-	-	1
14	130152Z	12.3N 135.6E	SAT			(T2.5/2.5 /D1.0/24HRS)	PCN 5 UMSP								
15	130152Z	12.4N 134.9E	SAT			(T3.0/3.0 / /HRS)	PCN 5 UMSP								
16	130248Z	11.4N 135.9E	P	10	2	1500 110 30 360	38 30 360	38	1001	-	27 25	-	-	-	1
17	131204Z	13.4N 132.4E	SAT				PCN 6 UMSP								
18	131344Z	13.6N 131.8E	SAT				PCN 5 UMSP								
19	131344Z	13.3N 132.1E	SAT				PCN 5 UMSP								
20	131555Z	12.3N 132.2E	P	-	-	700 - - -	- - -	-	-	-	-	-	-	-	3
21	132130Z	13.0N 131.6E	P	10	10	700 10 35 310	40 25 300	25	998	310	13 9	-	-	-	3
22	132304Z	13.0N 130.0E	SAT			(T3.0/3.0 /D0.5/24HRS)	PCN 3 UMSP								
23	132304Z	13.5N 130.4E	SAT			(T3.0/3.0 /S /24HRS)	PCN 3 UMSP								
24	140315Z	14.4N 129.5E	SAT			(T3.0/3.0 /D0.5/24HRS)	PCN 3 UMSP								
25	140444Z	14.3N 130.0E	P	10	5	1500 180 30 90	15 40 350	10	1001	-	-	-	-	-	4
26	140830Z	14.7N 129.3E	P	5	5	700 70 45 300	50 25 90	20	998	308	-	-	-	-	4
27	141145Z	15.2N 127.7E	SAT				PCN 5 UMSP								
28	141145Z	15.2N 127.1E	SAT				PCN 5 UMSP								
29	141540Z	15.2N 128.0E	P	8	8	700 30 45 330	40 - -	-	998	307	12 -	-	-	-	5
30	141557Z	15.3N 127.1E	SAT				PCN 5 UMSP								
31	141557Z	15.6N 127.6E	SAT				PCN 3 UMSP								
32	142050Z	15.6N 127.6E	P	1	2	700 20 45 300	30 4 270	20	994	305	15 -	-	-	-	5
33	142336Z	16.0N 126.6E	SAT			(T3.5/3.5 /S /24HRS)	NOAA-2			(CONF 01)					
34	150027Z	15.9N 126.6E	SAT			(T3.5/3.5 /D0.5/25HRS)	PCN 3 UMSP								
35	150257Z	16.0N 125.8E	SAT			(T3.5/3.5 /D0.5/25HRS)	PCN 3 UMSP								
36	150257Z	16.0N 126.1E	SAT			(T3.5/3.5 /D0.5/25HRS)	PCN 3 UMSP								
37	150855Z	16.8N 125.5E	P	5	5	700 20 70 270	15 5 230	10	990	304	15 13	CIRC	15	6	
38	151309Z	16.0N 124.7E	SAT			(IR DATA)	PCN 5 UMSP								
39	151535Z	17.1N 124.5E	P	5	10	700 200 80 110	20 - -	-	995	305	12 -	-	-	-	6
40	151538Z	16.6N 125.0E	SAT				PCN 5 UMSP								
41	151538Z	16.2N 124.4E	SAT				PCN 5 UMSP								
42	152117Z	17.6N 124.5E	P	5	5	700 30 35 130	20 55 90	20	994	305	14 -	-	-	-	7
43	160009Z	17.4N 124.5E	SAT			(T3.5/3.5 /S /24HRS)	PCN 3 UMSP								
44	160009Z	18.1N 124.4E	SAT			(T3.0/4.0 /W1.0/24HRS)	PCN 3 UMSP								
45	160009Z	17.6N 124.1E	SAT			(T3.5/3.5 /S /22HRS)	PCN 5 UMSP								
46	160230Z	18.0N 124.2E	P	10	5	700 30 40 10	50 4 330	20	995	305	14 -	-	-	-	7
47	160238Z	17.8N 124.2E	SAT			(T3.5/3.5 /S /24HRS)	PCN 3 UMSP								
48	160238Z	17.9N 124.2E	SAT			(T3.5/3.5 /S /22HRS)	PCN 5 UMSP								
49	160835Z	18.8N 123.7E	P	3	2	700 60 40 40	20 50 90	30	988	299	17 -	-	-	-	8
50	161250Z	18.6N 124.4E	SAT				PCN 3 UMSP								
51	161250Z	18.0N 124.2E	SAT				PCN 5 UMSP								
52	161445Z	19.2N 123.5E	P	5	15	700 280 55 180	30 50 10	70	995	304	14 -	-	-	-	8
53	161520Z	18.8N 123.8E	SAT				PCN 5 UMSP								
54	161520Z	17.6N 123.9E	SAT				PCN 5 UMSP								
55	162351Z	19.9N 124.2E	SAT			(T3.5/3.5 /S /24HRS)	PCN 3 UMSP								
56	162351Z	19.8N 124.1E	SAT			(T4.0/4.0 /D0.5/24HRS)	PCN 3 UMSP								
57	162359Z	19.0N 125.0E	SAT			(T3.5/3.5 /S /23HRS)	NOAA-2			(CONF 01)					
58	170220Z	20.4N 124.7E	SAT			(T3.5/3.5 /S /24HRS)	PCN 3 UMSP								
59	170220Z	20.2N 124.8E	SAT			(T2.5/3.0 /W0.5/26HRS)	PCN 3 UMSP								
60	170220Z	20.4N 124.6E	SAT			(T4.0/4.0 /D0.5/24HRS)	PCN 4 UMSP								
61	170230Z	21.0N 123.8E	P	10	5	700 130 50 50	40 50 00	60	-	-	10 14	-	-	-	9
62	170830Z	21.4N 125.3E	P	13	7	700 190 50 110	40 40 150	60	-	-	10 13	-	-	-	9
63	171232Z	21.9N 125.8E	SAT				PCN 5 UMSP								
64	171232Z	21.8N 125.9E	SAT				PCN 5 UMSP								
65	171501Z	22.5N 126.2E	SAT				PCN 5 UMSP								
66	171501Z	22.6N 126.7E	SAT				PCN 5 UMSP								
67	171501Z	22.7N 126.6E	SAT				PCN 5 UMSP								
68	172333Z	26.0N 128.6E	SAT			(T2.0/3.0 /W1.5/24HRS)	PCN 3 UMSP								
69	172333Z	26.0N 128.6E	SAT			(T2.0/3.0 /W2.0/24HRS)	PCN 3 UMSP								
70	180201Z	26.4N 129.1E	SAT			(T2.0/3.0 /W1.5/24HRS)	PCN 3 UMSP								
71	180201Z	26.6N 129.0E	SAT			(T2.0/2.5 /W0.5/24HRS)	PCN 3 UMSP								
72	180201Z	26.4N 128.9E	SAT			(T2.0/3.0 /W2.0/24HRS)	PCN 3 UMSP								
73	181214Z	29.0N 131.3E	SAT				PCN 5 UMSP								
74	181214Z	31.0N 134.1E	SAT				PCN 5 UMSP								
75	181443Z	30.0N 132.3E	SAT				PCN 6 UMSP								
76	190019Z	33.0N 139.5E	SAT			(T1.5/2.0 /W0.5/25HRS)	NOAA-2			(CONF 02)					

TROPICAL STORM FREDIA  
FIX POSITIONS FOR CYCLONE NO. 8  
0000Z 21 JUN TO 1200Z 22 JUN

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RRG	MAX OBS SFC WIND VEL BRG RRG	OBS MIN SLP	MIN 700MB HGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMBR
1	162209Z	18.0N 146.9E	SAT	(T1.0/1.0 /0 /24HRS)			PCN 5 DMSP								
2	162209Z	17.8N 146.9E	SAT	(T1.0/1.0 / / HRS)			PCN 3 DMSP								
3	170220Z	18.3N 146.2E	SAT	(T1.0/1.0 /0 /24HRS)			PCN 5 DMSP								
4	170220Z	17.7N 147.4E	SAT	(T1.0/1.0 / / HRS)			PCN 6 DMSP								
5	172332Z	18.5N 143.3E	SAT	(T1.5/1.5 /D0.5/24HRS)			PCN 5 DMSP								
6	172332Z	18.8N 143.3E	SAT	(T1.5/1.5 /D0.5/24HRS)			PCN 5 DMSP								
7	180201Z	19.5N 142.4E	SAT	(T1.5/1.5 /D0.5/24HRS)			PCN 3 DMSP								
8	180201Z	19.3N 141.6E	SAT	(T1.5/1.5 /D0.5/24HRS)			PCN 3 DMSP								
9	181443Z	19.7N 142.2E	SAT	(IR DATA)			PCN 5 DMSP								
10	182314Z	21.4N 142.7E	SAT	(IR DATA)			PCN 5 DMSP								
11	190142Z	21.7N 142.0E	SAT	(IR DATA)			PCN 5 DMSP								
12	191156Z	22.3N 142.4E	SAT	(IR DATA)			PCN 4 DMSP								
13	192256Z	23.2N 144.9E	SAT	(IR DATA)			PCN 5 DMSP								
14	200124Z	25.5N 145.5E	SAT	(IR DATA)			PCN 3 DMSP								
15	201137Z	25.8N 148.5E	SAT	(IR DATA)			PCN 3 DMSP								
16	202238Z	26.0N 151.3E	SAT	(T2.5/2.5 / / HRS)			PCN 3 DMSP								
17	210105Z	26.2N 151.9E	SAT	(T2.5/2.5 / / HRS)			PCN 3 DMSP								
18	210105Z	26.0N 151.9E	SAT	(T2.0/2.0 / / HRS)			PCN 4 DMSP								
19	210516Z	25.7N 152.8E	P	5 3 700 220 55 -			5 220 25 989 301 15 -				CTRC		5		1
20	211119Z	24.9N 154.9E	SAT				PCN 5 DMSP								
21	211119Z	24.9N 155.0E	SAT				PCN 4 DMSP								
22	211347Z	25.0N 155.6E	SAT				PCN 3 DMSP								
23	211347Z	24.9N 154.8E	SAT				PCN 6 DMSP								
24	212220Z	25.3N 158.1E	SAT	(T2.0/2.5 /W0.5/24HRS)			PCN 3 DMSP								
25	212220Z	24.9N 158.5E	SAT	(T1.5/2.0 /W0.5/24HRS)			PCN 4 DMSP								
26	220047Z	25.3N 159.1E	SAT	(T2.0/2.5 /W0.5/24HRS)			PCN 3 DMSP								
27	220047Z	25.1N 159.2E	SAT	(T1.5/2.0 /W0.5/24HRS)			PCN 4 DMSP								
28	230028Z	30.2N 172.8E	SAT	(IR DATA)			PCN 3 DMSP								

TYPHOON GILDA  
FIX POSITIONS FOR CYCLONE NO. 9  
0600Z 30 JUN TO 0000Z 07 JUL

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RRG	MAX OBS SFC WIND VEL BRG RRG	OBS MIN SLP	MIN 700MB HGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMBR
1	251006Z	17.3N 160.0E	SAT	(IR DATA)			PCN 6 DMSP								
2	260114Z	17.8N 156.2E	SAT	(IR DATA)			PCN 5 DMSP								
3	260948Z	18.0N 154.5E	SAT	(IR DATA)			PCN 6 DMSP								
4	261356Z	18.0N 154.1E	SAT	(IR DATA)			PCN 5 DMSP								
5	262230Z	18.0N 151.8E	SAT	(T1.0/1.0 / / HRS)			PCN 5 DMSP								
6	262230Z	18.0N 151.8E	SAT	(T1.5/1.5 / / HRS)			PCN 5 DMSP								
7	270055Z	18.1N 151.0E	SAT	(IR DATA)			PCN 5 DMSP								
8	270055Z	18.0N 150.9E	SAT	(IR DATA)			PCN 6 DMSP								
9	271500Z	18.5N 145.0E	SAT				PCN 6 DMSP								
10	272211Z	18.1N 148.6E	SAT	(T1.5/1.5 /D0.5/24HRS)			PCN 4 DMSP								
11	280218Z	18.1N 147.9E	SAT	(IR DATA)			PCN 4 DMSP								
12	281053Z	17.5N 146.8E	SAT	(IR DATA)			PCN 6 DMSP								
13	281500Z	17.7N 145.0E	SAT	(IR DATA)			PCN 5 DMSP								
14	282153Z	17.8N 143.4E	SAT	(T2.0/2.0 /D0.5/24HRS)			PCN 6 DMSP								
15	282235Z	18.0N 143.0E	SAT	(T1.5/1.5 /D0.5/24HRS)			NOAA-2 (CONF 02)								
16	282355Z	18.7N 143.1E	SAT	(IR DATA)			PCN 5 DMSP								
17	290200Z	18.8N 141.6E	SAT	(IR DATA)			PCN 4 DMSP								
18	290200Z	18.5N 141.6E	SAT	(T1.5/1.5 / / HRS)			PCN 5 DMSP								
19	290300Z	17.8N 141.6E	P	2 3 700 - - -			- 1009 311 9 - - -								1
20	291216Z	18.2N 140.0E	SAT	(IR DATA)			PCN 5 DMSP								
21	291216Z	19.3N 139.2E	SAT	(IR DATA)			PCN 6 DMSP								
22	291442Z	19.7N 139.7E	SAT				PCN 5 DMSP								
23	291442Z	19.5N 139.7E	SAT	(IR DATA)			PCN 6 DMSP								
24	292316Z	21.0N 136.7E	SAT	(IR DATA)			PCN 3 DMSP								
25	292316Z	19.4N 135.4E	SAT	(T1.5/1.5 /S /21HRS)			PCN 5 DMSP								
26	292345Z	21.5N 136.5E	SAT	(T2.5/2.5 /D1.0/24HRS)			NOAA-2 (CONF 02)								
27	300141Z	20.8N 135.8E	SAT	(IR DATA)			PCN 3 DMSP								
28	300141Z	20.4N 135.7E	SAT	(IR DATA)			PCN 5 DMSP								
29	301158Z	20.3N 134.9E	SAT	(IR DATA)			PCN 3 DMSP								
30	301341Z	19.5N 135.0E	P	5 3 700 80 30 360			25 - - 990 301 17 11 - - -								3
31	301423Z	20.2N 134.7E	SAT	(IR DATA)			PCN 3 DMSP								
32	301423Z	20.6N 135.5E	SAT	(IR DATA)			PCN 4 DMSP								
33	302150Z	19.8N 134.3E	P	3 2 700 150 30 70			100 25 70 100 990 301 14 11 - - -								4
34	302258Z	20.0N 134.0E	SAT	(T4.0/4.0 /D2.0/24HRS)			PCN 3 DMSP								
35	302258Z	19.7N 134.0E	SAT	(T3.0/3.0 /D1.5/24HRS)			PCN 3 DMSP								
36	302259Z	20.0N 135.0E	SAT	(T3.5/3.5 /D1.0/24HRS)			NOAA-2 (CONF 02)								
37	010235Z	19.4N 134.1E	P	5 2 700 340 40 270			60 30 270 60 983 296 14 11 - - -								4
38	010304Z	19.2N 134.0E	SAT	(IR DATA)			PCN 3 DMSP								
39	011140Z	19.4N 133.9E	SAT	(IR DATA)			PCN 4 DMSP								
40	011140Z	19.6N 133.3E	SAT	(IR DATA)			PCN 4 DMSP								
41	011237Z	18.5N 133.5E	SAT	(IR DATA)			NOAA-2 (CONF 01)								
42	011546Z	19.6N 133.4E	SAT	(IR DATA)			PCN 5 DMSP								
43	011546Z	19.4N 133.6E	SAT	(IR DATA)			PCN 4 DMSP								
44	012240Z	19.7N 132.2E	SAT	(IR DATA)			PCN 3 DMSP								
45	012240Z	19.4N 132.4E	SAT	(T4.0/4.0 /D1.0/24HRS)			PCN 4 DMSP								
46	020020Z	19.4N 132.3E	P	5 2 700 180 70 90			70 100 90 70 971 287 17 12 CTIC					50			6
47	020021Z	19.9N 132.4E	SAT	(IR DATA)			PCN 3 DMSP								
48	020021Z	20.0N 132.2E	SAT	(IR DATA)			PCN 3 DMSP								
49	020051Z	20.0N 132.5E	SAT	(T5.0/5.0 /D1.0/26HRS)			NOAA-2 (CONF 01)								
50	020246Z	19.8N 132.0E	SAT	(T4.5/4.5 /D0.5/24HRS)			PCN 1 DMSP								
51	020320Z	19.7N 132.0E	P	5 1 700 190 65 110			40 70 130 75 967 282 18 14 CTIC					30			6
52	021121Z	20.2N 130.7E	SAT	(IR DATA)			PCN 4 DMSP								
53	021127Z	20.1N 131.5E	SAT	(IR DATA)			PCN 6 DMSP								
54	021217Z	20.0N 130.8E	P	10 5 700 180 75 60			35 - - 961 277 18 14 CTIC					30			7
55	021303Z	20.4N 130.8E	SAT	(IR DATA)			PCN 2 DMSP								
56	021527Z	20.6N 130.6E	SAT	(IR DATA)			PCN 1 DMSP								
57	021528Z	20.9N 130.6E	SAT	(IR DATA)			PCN 2 DMSP								
58	021546Z	20.1N 130.7E	P	20 2 700 190 75 110			35 - - 961 277 17 14 ETIP				N-S	25A20			7
59	022137Z	21.0N 129.8E	P	2 3 700 180 70 70			12 80 110 12 963 278 15 13 CTIC					20			8
60	022351Z	21.5N 128.8E	SAT	(T5.5/5.5 /D0.5/24HRS)			NOAA-2 (CONF 01)								
61	030003Z	21.2N 129.9E	SAT	(T5.5/5.5 /D1.0/24HRS)			PCN 1 DMSP								

TYPHOON GILDA  
FIX POSITIONS FOR CYCLONE NO. 9  
0600Z 30 JUN TO 0000Z 07 JUL

FIX NO.	TIME	POSIT	FIX CAT	ACCHY	FIX LVL	MAX OBS DIR VEL BRG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN /00MB MGT	FLT LV/TO	EYE FORM	ORIEN- TATION	EYE DIA	POSIT OF RADAR	MSN NMHR
62	030003Z	21.0N 129.8E	SAT	(15.0/5.0 /D1.0/25HRS)			PCN 3 DMSP								
63	030227Z	21.5N 129.2E	SAT	(IR DATA)			PCN 1 DMSP								
64	030227Z	21.6N 129.3E	SAT	(IR DATA)			PCN 1 DMSP								
65	030232Z	21.5N 129.3E	P	2 3 700 360 70 290	60 60 40 40	956 272 17 13	CTRC					18			8
66	030935Z	22.7N 128.4E	P	5 5 700 130 65 50	30 70 160 15	951 267 18 -	CTRC					25			9
67	031233Z	22.0N 128.5E	SAT	(IR DATA)			NOAA-2 (CONF 01)								
68	031245Z	22.8N 128.4E	SAT	(IR DATA)			PCN 1 DMSP								
69	031245Z	23.2N 128.3E	SAT	(IR DATA)			PCN 2 DMSP								
70	031245Z	22.6N 128.3E	SAT	(IR DATA)			PCN 1 DMSP								
71	031430Z	23.2N 127.9E	P	5 5 700 260 50 200	20 - -	954 270 16 -	CTRC					20			9
72	031509Z	23.3N 127.8E	SAT	(IR DATA)			PCN 1 DMSP								
73	031509Z	23.6N 127.9E	SAT	(IR DATA)			PCN 2 DMSP								
74	031700Z	23.6N 127.8E	LRDR	- 45//3										24.8N 125.3E	
75	031800Z	23.7N 127.7E	LRDR	- 4//3										24.8N 125.3E	
76	031815Z	23.8N 127.6E	LRDR	- 15 DEG SPIRAL OVERLAY										26.4N 127.8E	
77	031843Z	23.8N 127.2E	LRDR	- 15 DEG SPIRAL OVERLAY										26.4N 127.8E	
78	031900Z	23.8N 127.6E	LRDR	- 5592										26.2N 127.8E	
79	031945Z	23.9N 127.5E	LRDR	- 6000 FIX										26.2N 127.8E	
80	032000Z	23.9N 127.5E	LRDR	- 41712										26.2N 127.7E	
81	032115Z	24.0N 127.5E	P	5 2 700 290 85 180 30	- - -	952 269 18 16	CTRC					18		26.2N 127.8E	10
82	032240Z	24.2N 127.3E	LRDR	- 6000 FIX										26.4N 127.8E	
83	032300Z	24.5N 127.3E	LRDR	- 55/42										24.3N 124.2E	
84	032300Z	24.3N 127.3E	LRDR	- 10612										26.2N 127.8E	
85	032300Z	24.4N 127.3E	LRDR	- 12773										24.8N 125.3E	
86	032300Z	24.3N 127.3E	LRDR	- 6000 FIX										26.4N 127.8E	
87	032320Z	24.3N 127.2E	LRDR	- 6000 FIX, 15 DEG SPIRAL OVERLAY										26.4N 127.8E	
88	032330Z	24.4N 127.3E	LRDR	- 6000 FIX										26.2N 127.7E	
89	032345Z	24.4N 127.1E	SAT	(15.5/5.5 /5 /24HRS)			PCN 1 DMSP								
90	032345Z	24.4N 127.2E	SAT	(16.0/6.0 /D1.0/24HRS)			PCN 1 DMSP								
91	032345Z	24.4N 127.1E	LRDR	- 6000 FIX, 15 DEG SPIRAL OVERLAY, 20 PERCENT WALL CLOUD										26.4N 127.8E	
92	040005Z	24.3N 127.4E	LRDR	-										26.2N 127.7E	
93	040015Z	24.5N 127.2E	LRDR	- 6000 FIX, CIRCULAR EYE 15 NM DIAM, 50 PERCENT WALL CLOUD										26.4N 127.8E	
94	040030Z	24.5N 127.1E	LRDR	- 6000 FIX										26.2N 127.7E	
95	040040Z	24.2N 127.6E	LRDR	-										26.2N 127.7E	
96	040045Z	24.7N 127.1E	LRDR	- 6000 FIX, CIRCULAR EYE 15 NM DIAM, 50 PERCENT WALL CLOUD										26.4N 127.8E	
97	040100Z	24.7N 127.1E	LRDR	- 95112										24.3N 124.2E	
98	040100Z	24.8N 127.1E	LRDR	- 10673										24.8N 125.3E	
99	040115Z	24.7N 126.9E	LRDR	- CIRCULAR EYE 12 NM DIAM, 60 PERCENT WALL CLOUD										26.4N 127.8E	
100	040145Z	24.8N 126.8E	LRDR	- 6000 FIX, CIRCULAR EYE 12 NM DIAM, 50 PERCENT WALL CLOUD										26.4N 127.8E	
101	040200Z	24.8N 126.9E	LRDR	- 12673										24.8N 125.3E	
102	040200Z	24.8N 126.9E	LRDR	- 10512										26.2N 127.8E	
103	040209Z	24.9N 126.8E	SAT	(IR DATA)			PCN 1 DMSP								
104	040209Z	25.0N 126.4E	SAT	(IR DATA)			PCN 1 DMSP								
105	040215Z	24.7N 126.7E	LRDR	- FAIR FIX, CIRCULAR EYE 12 NM DIAM, 40 PERCENT WALL CLOUD										26.4N 127.8E	
106	040230Z	24.8N 126.8E	LRDR	- 6000 FIX										26.2N 127.7E	
107	040245Z	24.8N 126.7E	LRDR	- CIRCULAR EYE 12 NM DIAM, 60 PERCENT WALL CLOUD										26.4N 127.8E	
108	040300Z	24.8N 127.0E	P	5 2 700 230 85 100 35	5 150 20 947	265 18 15	CTRC					15		24.8N 125.3E	10
109	040300Z	24.9N 126.7E	LRDR	- 12673										24.3N 124.2E	
110	040300Z	24.9N 126.7E	LRDR	- 45//3										26.4N 127.8E	
111	040315Z	24.8N 126.6E	LRDR	- 6000 FIX, CIRCULAR EYE 15 NM DIAM, 70 PERCENT WALL CLOUD										26.4N 127.8E	
112	040330Z	24.8N 126.7E	LRDR	- 6000 FIX										26.2N 127.7E	
113	040345Z	24.8N 126.6E	LRDR	- 6000 FIX, CIRCULAR EYE 15 NM DIAM, 60 PERCENT WALL CLOUD										26.4N 127.8E	
114	040350Z	24.7N 126.4E	SAT	(15.5/5.5 / / HRS)			PCN 1 DMSP								
115	040400Z	24.8N 126.6E	LRDR	- 10412										26.2N 127.8E	
116	040400Z	24.8N 126.7E	LRDR	- 55//3										24.3N 124.2E	
117	040400Z	24.9N 126.7E	LRDR	- 12623										24.8N 125.3E	
118	040415Z	24.9N 126.6E	LRDR	- 6000 FIX, CIRCULAR EYE 12 NM DIAM, 75 PERCENT WALL CLOUD										26.4N 127.8E	
119	040430Z	24.9N 126.6E	LRDR	- 6000 FIX										26.2N 127.7E	
120	040445Z	24.9N 126.6E	LRDR	- 6000 FIX, CIRCULAR EYE 12 NM DIAM, 75 PERCENT WALL CLOUD										26.4N 127.8E	
121	040500Z	24.9N 126.8E	LRDR	- 12613										24.8N 125.3E	
122	040500Z	24.9N 126.7E	LRDR	- 10412										26.2N 127.8E	
123	040500Z	24.9N 126.7E	LRDR	- 55//3										24.3N 124.2E	
124	040515Z	24.9N 126.6E	LRDR	- 6000 FIX, CIRCULAR EYE 12 NM DIAM, 70 PERCENT WALL CLOUD										26.4N 127.8E	
125	040545Z	24.9N 126.6E	LRDR	- 6000 FIX, CIRCULAR EYE 12 NM DIAM, 60 PERCENT WALL CLOUD										26.4N 127.8E	
126	040600Z	25.1N 126.8E	LRDR	- 12633										24.8N 125.3E	
127	040600Z	25.0N 126.8E	LRDR	- 5//3										24.3N 124.2E	
128	040615Z	24.9N 126.8E	LRDR	- FAIR FIX, CIRCULAR EYE 10 NM DIAM, 50 PERCENT WALL CLOUD										26.4N 127.8E	
129	040630Z	25.0N 126.8E	LRDR	- 6000 FIX										26.2N 127.7E	
130	040645Z	25.1N 126.8E	LRDR	- FAIR FIX, CIRCULAR EYE 10 NM DIAM, 50 PERCENT WALL CLOUD										26.4N 127.8E	
131	040700Z	25.1N 126.9E	LRDR	- 12613										24.8N 125.3E	
132	040700Z	25.1N 126.8E	LRDR	- 10532										26.2N 127.8E	
133	040700Z	25.1N 126.9E	LRDR	- 55//3										24.3N 124.2E	
134	040730Z	25.2N 126.7E	LRDR	- 6000 FIX										26.2N 127.7E	
135	040745Z	25.3N 127.0E	LRDR	- 6000 FIX, CIRCULAR EYE 10 NM DIAM, 70 PERCENT WALL CLOUD										26.4N 127.8E	
136	040800Z	25.2N 126.9E	LRDR	- 5//3										24.3N 124.2E	
137	040800Z	25.3N 126.9E	LRDR	- 11633										24.8N 125.3E	
138	040830Z	25.5N 126.8E	LRDR	- 6000 FIX										26.2N 127.7E	
139	040845Z	25.6N 126.8E	LRDR	- 6000 FIX, CIRCULAR EYE 10 NM DIAM, 60 PERCENT WALL CLOUD										26.4N 127.8E	
140	040930Z	25.7N 126.8E	LRDR	- 6000 FIX										26.2N 127.7E	
141	040945Z	25.7N 126.8E	LRDR	- 6000 FIX, CIRCULAR EYE 10 NM DIAM, 50 PERCENT WALL CLOUD										26.4N 127.8E	
142	041000Z	25.7N 126.7E	LRDR	- 12733										24.8N 125.3E	
143	041000Z	25.8N 126.8E	LRDR	- 10482										26.2N 127.8E	
144	041030Z	25.8N 126.6E	LRDR	- 6000 FIX										26.2N 127.7E	
145	041100Z	25.8N 126.5E	LRDR	- 12523										24.8N 125.3E	
146	041118Z	25.9N 126.4E	LRDR	- 6000 FIX, CIRCULAR EYE 25 NM DIAM, 60 PERCENT WALL CLOUD										26.4N 127.8E	
147	041145Z	25.9N 126.3E	LRDR	- 6000 FIX, CIRCULAR EYE 15 NM DIAM, 60 PERCENT WALL CLOUD										26.4N 127.8E	
148	041155Z	25.9N 126.3E	P	3 2 700 240 65 130 10	- - -	945 262 17 15	CTRC					10		26.4N 127.8E	11
149	041157Z	25.8N 126.5E	SAT	(IR DATA)			NON DMSP								
150	041200Z	25.8N 126.4E	LRDR	- 10482										26.2N 127.8E	
151	041200Z	25.8N 126.4E	LRDR	- 12513										24.8N 125.3E	
152	041213Z	25.8N 126.3E	LRDR	- 6000 FIX, CIRCULAR EYE 12 NM DIAM, 80 PERCENT WALL CLOUD										26.4N 127.8E	
153	041226Z	25.7N 126.4E	SAT	(IR DATA)			PCN 1 DMSP								
154	041226Z	26.0N 126.3E	SAT	(IR DATA)			PCN 2 DMSP								
155	041238Z	25.8N 126.3E	LRDR	- 6000 FIX, CIRCULAR EYE 12 NM DIAM, 90 PERCENT WALL CLOUD										26.4N 127.8E	
156	041300Z	25.7N 126.4E	LRDR	- 12513										24.8N 125.3E	
157	041300Z	25.8N 126.3E	LRDR	- 105//										26.2N 127.8E	
158	041400Z	25.9N 126.5E	LRDR	- 12633										24.8N 125.3E	
159	041400Z	25.8N 126.5E	LRDR	- 10612										26.2N 127.8E	
160	041430Z	25.9N 126.5E	LRDR	- 6000 FIX										26.2N 127.7E	



TYPHOON GILDA  
FIX POSITIONS FOR CYCLONE NO. 9  
0600Z 30 JUN TO 0000Z 07 JUL

FIX NO.	TIME	POSIT	FIX ACCY	FIX CAT NAV-MET	FIX LVL	DIR	VEL	BRG	RNG	MAX OBS SFC WIND	MAX OBS VEL	MAX OBS BRG	MAX OBS RNG	UWS SLP	MIN 100MB	FLT LVL	EYE FORM	ORIEN- TATION	EYE DIA	POSIT OF RADAR	MSH NMHR
161	041431Z	25.9N 126.6E		P 2 1	700	70	68	330	10	-	-	-	-	444	263	18	16	CTNC	15	26.4N 127.8E	11
162	041448Z	25.9N 126.5E	LNRK	-	GOOD FIX, CIRCULAR EYE 28 NM DIAM, 50 PERCENT WALL CLOUD															26.4N 127.8E	
163	041450Z	25.7N 126.6E	SAT	(IR DATA)						PCN 1 DMSP											
164	041500Z	25.9N 126.5E	LNRK	-	1142															26.2N 127.8E	
165	041548Z	26.3N 126.6E	LNRK	-	FAIR FIX, 10 DEG SPIRAL OVERLAY, 40 PERCENT WALL CLOUD															26.4N 127.8E	
166	041600Z	26.4N 126.6E	LNRK	-	12623															24.8N 125.3E	
167	041600Z	26.3N 126.5E	LNRK	-	12732															26.2N 127.8E	
168	041630Z	26.4N 126.5E	LNRK	-	GOOD FIX															26.2N 127.7E	
169	041632Z	26.2N 126.5E	SAT	(IR DATA)						PCN 3 DMSP											
170	041640Z	26.6N 126.5E	LNRK	-	FAIR FIX, CIRCULAR EYE 18 NM DIAM, 50 PERCENT WALL CLOUD															26.4N 127.8E	
171	041700Z	26.6N 126.4E	LNRK	-	12832															26.2N 127.8E	
172	041730Z	26.7N 126.2E	LNRK	-	GOOD FIX															26.2N 127.7E	
173	041800Z	26.8N 126.1E	LNRK	-	21842															26.2N 127.8E	
174	041800Z	26.8N 126.3E	LNRK	-	22753															24.8N 125.3E	
175	041815Z	26.8N 126.2E	LNRK	-	FAIR FIX, 10 DEG SPIRAL OVERLAY, 40 PERCENT WALL CLOUD															26.4N 127.8E	
176	041830Z	26.8N 126.0E	LNRK	-	GOOD FIX															26.2N 127.7E	
177	041900Z	26.9N 126.1E	LNRK	-	2 172															24.8N 125.3E	
178	041900Z	26.7N 126.0E	LNRK	-	51742															26.2N 127.8E	
179	041913Z	26.8N 126.3E	LNRK	-	POOR FIX, EXTRAP EYE, 20 PERCENT WALL CLOUD															26.4N 127.8E	
180	041915Z	26.8N 126.3E	LNRK	-	FAIR FIX, 10 DEG SPIRAL OVERLAY, 30 PERCENT WALL CLOUD															26.4N 127.8E	
181	041930Z	26.8N 125.8E	LNRK	-	GOOD FIX															26.2N 127.7E	
182	041942Z	26.8N 126.3E	LNRK	-	FAIR FIX, 10 DEG SPIRAL OVERLAY, 30 PERCENT WALL CLOUD															26.4N 127.8E	
183	041943Z	26.8N 126.3E	LNRK	-	POOR FIX															26.4N 127.8E	
184	042000Z	26.8N 126.0E	LNRK	-	21772															24.8N 125.3E	
185	042030Z	26.7N 126.2E	LNRK	-	GOOD FIX															26.2N 127.7E	
186	042100Z	26.7N 126.1E	LNRK	-	21612															26.2N 127.8E	
187	042100Z	26.9N 126.3E	LNRK	-	31773															24.8N 125.3E	
188	042115Z	26.8N 126.3E	LNRK	-	GOOD FIX, 50 PERCENT WALL CLOUD															26.4N 127.8E	
189	042140Z	26.8N 126.3E	LNRK	-	GOOD FIX, 60 PERCENT WALL CLOUD															26.4N 127.8E	
190	042200Z	26.8N 126.3E	LNRK	-	20612															26.4N 127.8E	
191	042215Z	26.9N 126.3E	LNRK	-	FAIR FIX, UNIFORM EYE, 35 PERCENT WALL CLOUD															26.4N 127.8E	
192	042247Z	26.9N 126.3E	LNRK	-	FAIR FIX, 30 PERCENT WALL CLOUD															26.4N 127.8E	
193	042300Z	27.1N 126.5E	LNRK	-	FAIR FIX, 30 PERCENT WALL CLOUD															24.8N 127.8E	
194	042300Z	27.1N 126.4E	LNRK	-	GOOD FIX															26.2N 127.7E	
195	042315Z	27.1N 126.3E	LNRK	-	FAIR FIX, 30 PERCENT WALL CLOUD															26.4N 127.8E	
196	042327Z	27.7N 126.3E	SAT	(13.5/4.5 /W2.0/24HRS)						PCN 3 DMSP											
197	042327Z	27.1N 126.0E	SAT	(15.0/6.0 /W1.0/24HRS)						PCN 3 DMSP											
198	042330Z	27.5N 126.3E	LNRK	-	GOOD FIX															26.2N 127.7E	
199	042344Z	27.7N 126.3E	SAT	(16.5/6.5 /S- /23HRS)						NOAA-2										(CONF 01)	
200	042345Z	27.2N 126.3E	LNRK	-	FAIR FIX, 30 PERCENT WALL CLOUD															26.4N 127.8E	
201	050012Z	27.4N 126.3E	LNRK	-	FAIR FIX, 10 DEG SPIRAL OVERLAY, 30 PERCENT WALL CLOUD															26.4N 127.8E	
202	050030Z	27.5N 126.3E	LNRK	-	GOOD FIX															26.2N 127.7E	
203	050100Z	27.6N 126.3E	LNRK	-	GOOD FIX															26.2N 127.7E	
204	050200Z	27.8N 125.8E	LNRK	-	01773															26.2N 127.8E	
205	050230Z	27.8N 126.3E	LNRK	-	GOOD FIX															26.2N 127.7E	
206	050245Z	27.8N 126.5E	LNRK	-	POOR FIX															26.4N 127.8E	
207	050332Z	27.9N 126.7E	SAT	(IR DATA)						PCN 3 DMSP											
208	050332Z	27.8N 126.0E	SAT	(14.0/5.0 /W1.5/24HRS)						PCN 3 DMSP											
209	050400Z	28.0N 126.1E	P 5 5	700 170 70 60	35 50 60	60	958	273	18	15	CTNC							35	26.2N 127.8E	16	
210	050400Z	28.3N 125.8E	LNRK	-	01773																
211	050400Z	28.9N 126.6E	P 5 5	700 220 80 160	100 75 280	90	955	271	17	15	CTNC							30		16	
212	051208Z	29.2N 126.3E	SAT	(IR DATA)						PCN 3 DMSP											
213	051208Z	29.5N 126.2E	SAT	(IR DATA)						PCN 4 DMSP											
214	051813Z	30.2N 127.1E	SAT	(IR DATA)						PCN 4 DMSP											
215	052100Z	30.7N 126.8E	LNRK	-	01773															30.6N 131.0E	13
216	052142Z	31.2N 126.4E	P 8 4	700 160 82 90	106 50 90 106	962	275	17	13	-	-	-									
217	052200Z	31.0N 126.7E	LNRK	-	01773															30.6N 131.0E	
218	052308Z	31.4N 126.9E	SAT	(13.0/4.0 /W2.0/24HRS)						PCN 3 DMSP											
219	060000Z	31.6N 127.0E	LNRK	-	01772															30.6N 131.0E	
220	060037Z	32.0N 129.6E	SAT	(14.5/4.5 /W2.0/25HRS)						NOAA-2											
221	060100Z	31.8N 127.1E	LNRK	-	01773															33.4N 130.4E	
222	060100Z	31.8N 127.2E	LNRK	-	01772															30.6N 131.0E	
223	060200Z	32.0N 127.1E	LNRK	-	01772															33.4N 130.4E	
224	060300Z	32.2N 127.2E	LNRK	-	01702															33.4N 130.4E	
225	060313Z	32.1N 127.0E	SAT	(IR DATA)						PCN 3 DMSP											
226	060323Z	31.7N 127.3E	P 10 3	700 130 70 30	70 55 170 140	964	277	15	12	-	-	-								14	
227	060400Z	32.3N 127.3E	LNRK	-	01772															33.4N 130.4E	
228	060400Z	32.4N 127.4E	LNRK	-	01771															30.6N 131.0E	
229	060415Z	32.1N 127.5E	LNRK	-	CIRCULAR EYE OPEN TO SE, 30 PERCENT WALL CLOUD															33.3N 126.6E	
230	060500Z	32.4N 127.3E	LNRK	-	01772															33.4N 130.4E	
231	060515Z	32.6N 127.6E	LNRK	-	CIRCULAR EYE OPEN TO SE AND S, 30 PERCENT WALL CLOUD															33.3N 126.6E	
232	060600Z	32.8N 127.5E	LNRK	-	01742															33.4N 130.4E	
233	060600Z	32.7N 127.5E	LNRK	-	POOR FIX															33.6N 130.5E	
234	060615Z	32.8N 127.7E	LNRK	-	CIRCULAR EYE OPEN TO SE AND S, 40 PERCENT WALL CLOUD															33.3N 126.6E	
235	060600Z	33.2N 127.8E	LNRK	-	01742															33.6N 130.4E	
236	061000Z	33.1N 128.0E	LNRK	-	01702															33.4N 130.4E	
237	061100Z	33.4N 128.1E	LNRK	-	13472																
238	061115Z	33.6N 128.0E	LNRK	-																	
239	061130Z	33.3N 128.3E	LNRK	-	POOR FIX															33.6N 130.5E	
240	061150Z	33.5N 128.0E	SAT	(IR DATA)						PCN 5 DMSP											
241	061150Z	34.0N 127.9E	SAT	(IR DATA)						PCN 4 DMSP											
242	061200Z	33.5N 128.2E	LNRK	-	20932															33.4N 130.4E	
243	061300Z	33.7N 128.3E	LNRK	-	20932															33.6N 130.4E	
244	061400Z	33.8N 128.3E	LNRK	-	30912																

TROPICAL STORM HARRIET  
FIX POSITIONS FOR CYCLONE NO. 10  
0600Z 15 JUL TO 0600Z 18 JUL

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	FLT DIR	MAX OBS LVL	WIND BRG	MAX OBS SFC WIND VEL	WIND BRG	OBS SLP	MIN MGT	FLT LVL	FLY TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMN
1	122242Z	10.8N 148.4E	SAT	(T1.0/1.0 /	/	HMS)			PCN 5	UMSP									
2	122330Z	12.0N 149.0E	SAT	(T1.5/1.5 /D1.0/24HMS)					NOAA-2		(CONF 01)								
3	130103Z	11.1N 148.3E	SAT	(IR DATA					PCN 5	UMSP									
4	131037Z	13.0N 147.0E	SAT	(IR DATA					NOAA-2		(CONF 02)								
5	131123Z	12.3N 146.7E	SAT	(IR DATA					PCN 5	UMSP									
6	131345Z	12.7N 146.2E	SAT	(IR DATA					PCN 6	UMSP									
7	132224Z	14.2N 145.9E	SAT	(T2.0/2.0 /D1.0/24HMS)					PCN 6	UMSP									
8	140202Z	15.3N 144.2E	SAT	(IR DATA					PCN 5	UMSP									
9	141105Z	15.1N 142.7E	SAT	(IR DATA					PCN 3	UMSP									
10	141107Z	15.0N 142.5E	SAT	(IR DATA					NOAA-2		(CONF 01)								
11	141508Z	16.0N 141.9E	SAT	(IR DATA					PCN 3	UMSP									
12	141508Z	16.0N 141.9E	SAT	(IR DATA					PCN 3	UMSP									
13	142323Z	16.9N 139.1E	SAT	(T2.5/2.5 /S /24HMS)					NOAA-2		(CONF 02)								
14	142324Z	17.3N 138.5E	SAT	(IR DATA					NOAA-2		(CONF 02)								
15	142347Z	17.8N 140.3E	SAT	(T2.0/2.0 / /HMS)					PCN 5	UMSP									
16	142347Z	17.5N 140.7E	SAT	(T2.0/2.0 /S /24HMS)					PCN 5	UMSP									
17	150207Z	17.7N 139.1E	SAT	(IR DATA					PCN 5	UMSP									
18	150207Z	17.5N 139.5E	SAT	(IR DATA					PCN 5	UMSP									
19	150430Z	17.8N 139.2E	P	10 5 1500 130 45 60					10 1001										
20	150930Z	18.7N 138.4E	P	10 1 1500 50 48 320					25 40 60 25 996										
21	151203Z	19.0N 137.8E	SAT	(IR DATA					NOAA-2		(CONF 01)								
22	151203Z	19.0N 138.0E	SAT	(IR DATA					NOAA-2										
23	151228Z	18.8N 137.9E	SAT	(IR DATA					PCN 5	UMSP									
24	151228Z	19.3N 137.9E	SAT	(IR DATA					PCN 5	UMSP									
25	151449Z	19.9N 136.9E	SAT	(IR DATA					PCN 3	UMSP									
26	151449Z	19.9N 136.9E	SAT	(IR DATA					PCN 5	UMSP									
27	151555Z	19.6N 136.3E	P	5 10 700 200 28 70					40 - -										
28	152040Z	20.5N 136.1E	P	3 2 700 130 35 30					30 4 310 10 997										
29	152329Z	21.0N 135.7E	SAT	(T3.0/3.0 /D1.0/24HMS)					PCN 3	UMSP									
30	152329Z	21.0N 135.8E	SAT	(T3.0/3.0 /D1.0/24HMS)					PCN 3	UMSP									
31	160016Z	21.0N 135.0E	SAT	(T2.5/3.0 /W0.5/24HMS)					NOAA-2		(CONF 01)								
32	160017Z	21.0N 134.5E	SAT	(T1.5/2.0 /W1.0/24HMS)					NOAA-2		(CONF 01)								
33	160149Z	21.6N 135.1E	SAT	(IR DATA					PCN 3	UMSP									
34	160149Z	21.5N 135.0E	SAT	(IR DATA					PCN 3	UMSP									
35	160351Z	22.0N 134.9E	P	5 3 700 250 30 170					65 50 90 15 998										
36	160952Z	23.1N 134.2E	P	5 2 700 240 30 160					38 4 100 38 998										
37	161210Z	22.6N 132.6E	SAT	(IR DATA					PCN 1	UMSP									
38	161210Z	22.8N 133.5E	SAT	(IR DATA					PCN 5	UMSP									
39	161431Z	23.0N 132.3E	SAT	(IR DATA					PCN 5	UMSP									
40	161431Z	23.2N 132.6E	SAT	(IR DATA					PCN 5	UMSP									
41	161612Z	24.2N 133.3E	SAT	(IR DATA					PCN 5	UMSP									
42	161700Z	24.1N 132.8E	P	20 3 700 190 30 120					25 - -										
43	162118Z	24.8N 132.7E	P	5 2 700 220 40 150					40 40 60 40 1002										
44	162310Z	25.1N 133.1E	SAT	(T2.0/3.0 /W1.0/24HMS)					PCN 3	UMSP									
45	162310Z	25.0N 133.0E	SAT	(T2.0/3.0 /W1.0/24HMS)					PCN 3	UMSP									
46	170111Z	26.0N 133.4E	SAT	(T1.5/2.0 /S /24HMS)					NOAA-2		(CONF 01)								
47	170312Z	26.1N 133.0E	SAT	(IR DATA					PCN 3	UMSP									
48	170312Z	26.1N 132.7E	SAT	(IR DATA					PCN 3	UMSP									
49	171152Z	27.8N 133.2E	SAT	(IR DATA					PCN 6	UMSP									
50	171152Z	27.4N 132.8E	SAT	(IR DATA					PCN 3	UMSP									
51	171554Z	28.5N 134.1E	SAT	(IR DATA					PCN 3	UMSP									
52	171850Z	27.0N 132.0E	SAT	(IR DATA					NOAA-2		(CONF 01)								
53	172252Z	29.2N 135.0E	SAT	(T1.0/2.0 /W1.0/24HMS)					PCN 3	UMSP									
54	172252Z	29.1N 135.0E	SAT	(T1.0/2.0 /W1.0/24HMS)					PCN 3	UMSP									
55	180253Z	29.2N 135.8E	SAT	(IR DATA					PCN 3	UMSP									
56	180253Z	29.0N 135.7E	SAT	(IR DATA					PCN 3	UMSP									
57	181134Z	29.7N 138.1E	SAT	(IR DATA					PCN 3	UMSP									

TROPICAL STORM JEAN  
FIX POSITIONS FOR CYCLONE NO. 11  
0900Z 17 JUL TO 0600Z 20 JUL

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	MAX OBS			MAX OBS			OBS MIN SLP	MIN MGT	FLT LVL	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSK NMN
						FLT LVL	WIND DIR	WIND BRG	SFC WIND VEL	WIND BRG	RNG								
1	150207Z	16.8N 132.3E	SAT	(T1.0/1.0 /	/	HMS)			PCN 3	DMSP									
2	150207Z	16.8N 132.8E	SAT	(T1.5/1.5 /	/	HMS)			PCN 5	DMSP									
3	151228Z	17.3N 129.7E	SAT	(IR DATA					PCN 5	DMSP									
4	151449Z	18.2N 128.5E	SAT	(IR DATA					PCN 5	DMSP									
5	151449Z	18.3N 128.3E	SAT	(IR DATA					PCN 5	DMSP									
6	152329Z	17.7N 129.3E	SAT	(T1.5/1.5 /D0.5/24HMS)					PCN 3	DMSP									
7	152329Z	17.8N 129.4E	SAT	(T2.0/2.0 /D0.5/24HMS)					PCN 3	DMSP									
8	160018Z	17.5N 129.0E	SAT	(T1.5/1.5 /D1.0/24HMS)					NOAA-2		(CONF 01)								
9	160330Z	17.8N 128.6E	SAT	(IR DATA					PCN 5	DMSP									
10	160330Z	18.6N 128.5E	SAT	(IR DATA					PCN 5	DMSP									
11	160751Z	18.3N 128.8E	P	5 15 1500 210 25 130					25 25 130 20 1004										
12	161210Z	18.5N 128.4E	SAT	(IR DATA					PCN 5	DMSP									
13	161210Z	19.0N 127.6E	SAT	(IR DATA					PCN 5	DMSP									
14	161612Z	19.7N 126.0E	SAT	(IR DATA					PCN 3	DMSP									
15	162310Z	19.7N 127.3E	SAT	(T2.0/2.0 /D0.5/24HMS)					PCN 3	DMSP									
16	162310Z	19.8N 127.3E	SAT	(T3.0/3.0 /D1.0/24HMS)					PCN 3	DMSP									
17	170111Z	20.0N 126.8E	SAT	(T2.0/2.0 /D0.5/24HMS)					NOAA-2		(CONF 01)								
18	170312Z	19.7N 126.9E	SAT	(IR DATA					PCN 3	DMSP									
19	170312Z	19.9N 126.9E	SAT	(IR DATA					PCN 3	DMSP									
20	171152Z	20.2N 126.1E	SAT	(IR DATA					PCN 5	DMSP									
21	171152Z	20.4N 125.9E	SAT	(IR DATA					PCN 6	DMSP									
22	171158Z	19.7N 125.6E	SAT	(IR DATA					NOAA-2		(CONF 02)								
23	171401Z	20.3N 126.3E	P	10 10 700 40 30 320					50 - -										
24	171554Z	20.5N 126.2E	SAT	(IR DATA					PCN 3	DMSP									
25	171554Z	20.6N 126.1E	SAT	(IR DATA					PCN 3	DMSP									
26	172430Z	21.2N 125.3E	P	10 2 700 120 38 60					30 4 60 45 998										
27	180013Z	20.8N 125.0E	SAT	(T3.0/3.0 /D0.5/24HMS)					NOAA-2		(CONF 01)								
28	180034Z	21.2N 125.3E	SAT	(T3.0/3.0 /	/	HMS)			PCN 3	DMSP									
29	180253Z	21.2N 124.5E	SAT	(T3.5/3.5 /D1.5/24HMS)					PCN 3	DMSP									
30	180253Z	21.2N 123.9E	SAT	(T3.5/3.5 /D0.5/24HMS)					PCN 3	DMSP									

TROPICAL STORM JEAN  
FIX POSITIONS FOR CYCLONE NO. 11  
0000Z 17 JUL to 0600Z 20 JUL

FIX NO.	TIME	POSIT	FIX CAT	ACQTY	FIX NAV-MET	FLY LVL	MAX OBS DIR VEL	MAX OBS WIND BKG RING	MAX OBS SFC WIND VEL	MAX OBS SFC WIND RING	MAX OBS MIN SLP	MAX OBS MIN MGT	MAX OBS MIN LVL	MAX OBS MIN T1/T0	MAX OBS EYE FORM	MAX OBS ORIENTATION	MAX OBS EYE DIA	MAX OBS POSIT OF MAUW	MAX OBS MSA NM
31	180900Z	21.0N 123.1E	LHDM	-	6/110													24.3N 124.2E	
32	181000Z	21.0N 123.1E	LHDM	-	7/111													24.0N 125.3E	
33	181100Z	22.0N 123.7E	LHDM	-	8/110													24.3N 124.2E	
34	181100Z	22.0N 123.7E	LHDM	-	7/111													24.0N 125.3E	
35	181200Z	22.1N 123.5E	LHDM	-	55/10													24.3N 124.2E	
36	181200Z	22.1N 123.5E	LHDM	-	7/111													24.0N 125.3E	
37	181210Z	22.1N 123.9E	P	5	2 700	140	45	60	30	-	-	-	995	307	14	11	-	24.0N 125.3E	5
38	181255Z	22.6N 124.0E	SAT	(IR DATA						NOAA-2					(CONF U1)			24.0N 125.3E	
39	181300Z	22.2N 123.4E	LHDM	-	7/111													24.3N 124.2E	
40	181300Z	22.2N 123.2E	LHDM	-	6/111													24.3N 124.2E	
41	181315Z	22.4N 124.0E	SAT	(IR DATA						PCN 3 DMSP								24.0N 125.3E	
42	181315Z	22.5N 123.5E	SAT	(IR DATA						PCN 4 DMSP								24.3N 124.2E	
43	181400Z	22.2N 123.2E	LHDM	-	7/111													24.0N 125.3E	
44	181400Z	22.3N 123.1E	LHDM	-	6/111													24.3N 124.2E	
45	181450Z	22.8N 123.1E	LHDM	-	55/13													24.0N 121.6E	
46	181500Z	22.4N 123.0E	LHDM	-	5/111													24.3N 124.2E	
47	181500Z	22.4N 123.0E	LHDM	-	7/111													24.0N 125.3E	
48	181525Z	22.4N 123.1E	P	5	2 700	120	55	340	70	-	-	-	995	305	14	13	-	24.0N 125.3E	5
49	181535Z	22.6N 122.8E	SAT	(IR DATA						PCN 3 DMSP								24.0N 125.3E	
50	181535Z	22.6N 122.9E	SAT	(IR DATA						PCN 3 DMSP								24.0N 125.3E	
51	181600Z	22.6N 122.9E	LHDM	-	7/111													24.0N 125.3E	
52	181600Z	22.6N 123.0E	LHDM	-	5/111													24.3N 124.2E	
53	181700Z	22.7N 122.8E	LHDM	-	7/111													24.0N 125.3E	
54	181800Z	22.8N 123.3E	LHDM	-	45/13													24.0N 121.6E	
55	181800Z	22.9N 122.8E	LHDM	-	6/111													24.3N 124.2E	
56	181800Z	23.1N 122.8E	LHDM	-	7/111													24.0N 125.3E	
57	181900Z	23.1N 122.8E	LHDM	-	5/111													24.3N 124.2E	
58	182000Z	23.3N 122.6E	LHDM	-	6/111													24.0N 125.3E	
59	182000Z	23.3N 122.7E	LHDM	-	7/111													24.0N 125.3E	
60	182100Z	23.3N 122.7E	LHDM	-	7/111													24.0N 125.3E	
61	182100Z	23.3N 122.5E	LHDM	-	5/111													24.3N 124.2E	
62	182200Z	23.4N 122.5E	LHDM	-	6/111													24.0N 125.3E	
63	182300Z	23.6N 122.4E	LHDM	-	6/111													24.3N 124.2E	
64	182405Z	23.6N 122.0E	LHDM	-	GOOD FIX													24.0N 121.6E	
65	190005Z	23.8N 122.8E	LHDM	-	GOOD FIX, ELLIPTICAL EYE E-W													24.3N 120.6E	
66	190015Z	23.7N 122.6E	SAT	(IR DATA						PCN 3 DMSP								24.0N 122.0E	
67	190015Z	23.7N 122.4E	SAT	(14.0/4.0 / / HRS)						PCN 1 DMSP								24.0N 125.3E	
68	190015Z	23.8N 122.4E	SAT	(14.5/4.5-/01.0/24HRS)						PCN 1 DMSP								24.0N 121.6E	
69	190100Z	23.9N 122.5E	LHDM	-	6/113													24.3N 124.2E	
70	190100Z	23.5N 122.0E	SAT	(13.0/3.0 / 5 / 24HRS)						NOAA-2					(CONF U1)			24.0N 122.0E	
71	190120Z	24.1N 122.5E	LHDM	-	FAIR FIX, TEAR DMSP EYE													24.0N 125.3E	
72	190200Z	24.0N 122.3E	LHDM	-	5/112													24.0N 122.0E	
73	190220Z	24.2N 122.3E	LHDM	-	ELLIPTICAL EYE 34/70													24.0N 122.0E	
74	190235Z	24.5N 122.3E	SAT	(14.0/4.0-/00.5/24HRS)						PCN 3 DMSP								24.0N 122.0E	
75	190235Z	24.1N 122.1E	SAT	(IR DATA						PCN 3 DMSP								24.0N 122.0E	
76	190320Z	24.3N 122.2E	LHDM	-	CIRCULAR EYE, 45 NM DIAM													24.3N 124.2E	
77	190400Z	24.7N 122.2E	LHDM	-	6/111													24.0N 125.3E	
78	190400Z	24.7N 122.0E	LHDM	-	5/111													25.0N 121.6E	
79	190400Z	24.6N 122.1E	LHDM	-														24.0N 122.0E	
80	190420Z	24.6N 122.1E	LHDM	-	CIRCULAR EYE, 22 NM DIAM, OPEN TO NW-B													24.3N 124.2E	
81	190500Z	24.9N 122.2E	LHDM	-	6/112													24.0N 125.3E	
82	190500Z	24.9N 121.8E	LHDM	-	47/111													24.3N 124.2E	
83	190800Z	25.5N 122.0E	LHDM	-	6/111													24.0N 125.3E	
84	191257Z	25.4N 122.5E	SAT	(IR DATA						PCN 3 DMSP								24.3N 124.2E	
85	191257Z	26.5N 121.7E	SAT	(IR DATA						PCN 5 DMSP								24.0N 125.3E	
86	191517Z	27.6N 121.6E	SAT	(IR DATA						PCN 5 DMSP								25.0N 121.6E	
87	191517Z	27.2N 121.0E	SAT	(IR DATA						PCN 5 DMSP								24.0N 122.0E	
88	192357Z	30.1N 122.1E	SAT	(11.5/2.5-/03.0/24HRS)						PCN 3 DMSP								24.0N 125.3E	
89	200005Z	30.1N 122.0E	SAT	(12.5/2.5 /00.5/24HRS)						NOAA-2					(CONF U1)			24.3N 124.2E	
90	200216Z	31.0N 122.3E	SAT	(IR DATA						PCN 3 DMSP								24.0N 125.3E	

TYPHOON IVY  
FIX POSITIONS FOR CYCLONE NO. 12  
0600Z 17 JUL TO 1800Z 22 JUL

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL	MAX OBS WIND BRG RNG	MAX OBS SFC BRG RNG	OBS MIN SLP	MIN 700MB	FLT LVL	EYE FORM	UNEN- TATION	EYE DIA	MUSIT OF MAWAH	MSN NMOK
1	150207Z	11.4N 151.4E	SAT	(11.0/1.0 /				PCN 5 DMSP								
2	151047Z	11.4N 149.7E	SAT	(11.0 DATA				PCN 5 DMSP								
3	151449Z	11.3N 147.9E	SAT	(11.0 DATA				PCN 5 DMSP								
4	151449Z	11.1N 148.0E	SAT	(11.0 DATA				PCN 5 DMSP								
5	160149Z	11.8N 146.8E	SAT	(11.5/1.5 /00.5/24HRS)				PCN 3 DMSP								
6	161029Z	11.5N 144.2E	SAT	(11.0 DATA				PCN 5 DMSP								
7	161431Z	11.4N 143.2E	SAT	(11.0 DATA				PCN 5 DMSP								
8	162310Z	11.8N 140.6E	SAT	(12.0/2.0 /00.5/24HRS)				PCN 5 DMSP								
9	162320Z	11.8N 139.0E	SAT	(11.5/1.5 /01.0/24HRS)				NOAA-2								
10	170130Z	12.2N 139.4E	SAT	(11.0 DATA				PCN 5 DMSP								
11	170605Z	11.8N 139.5E	P	5 5 1500	50	30	310	40 3 310	40	1002	-	22	22	CIRC	25	1
12	170925Z	12.0N 138.7E	P	8 10 700	130	35	60	40 30 60	40	1004	310	9	9	CIRC	25	1
13	171152Z	12.2N 137.5E	SAT	(11.0 DATA				PCN 5 DMSP								
14	171152Z	12.0N 137.5E	SAT	(11.0 DATA				PCN 6 DMSP								
15	171412Z	12.0N 136.7E	SAT	(11.0 DATA				PCN 5 DMSP								
16	171450Z	12.7N 136.8E	P	5 5 700	170	35	100	45 - -	-	1002	309	10	7	CTRC	40	2
17	172045Z	13.1N 135.2E	P	5 1 700	110	60	10	20 60 130	18	997	306	11	10	CTRC	30	2
18	172252Z	13.0N 134.3E	SAT	(13.5/3.5 /01.5/24HRS)				PCN 5 DMSP								
19	172252Z	13.3N 134.3E	SAT	(12.5/2.5 / / MRS)				PCN 3 DMSP								
20	172252Z	13.1N 134.4E	SAT	(13.5/3.5 / / MRS)				PCN 3 DMSP								
21	180015Z	13.0N 134.2E	SAT	(13.0/3.0 /01.0/24HRS)				NOAA-2								
22	180253Z	13.2N 133.2E	SAT	(11.0 DATA				PCN 1 DMSP								
23	180253Z	13.5N 133.4E	SAT	(11.0 DATA				PCN 3 DMSP								
24	181057Z	13.6N 131.3E	SAT	(11.0 DATA				NOAA-2								
25	181134Z	14.2N 131.1E	SAT	(11.0 DATA				PCN 5 DMSP								
26	181134Z	14.0N 130.9E	SAT	(11.0 DATA				PCN 5 DMSP								
27	181228Z	14.2N 130.8E	P	5 2 700	130	80	90	20 - -	-	987	297	14	10	CTRC	15	3
28	181535Z	14.2N 130.0E	SAT	(11.0 DATA				PCN 5 DMSP								
29	181535Z	14.6N 129.8E	SAT	(11.0 DATA				PCN 5 DMSP								
30	181559Z	14.3N 130.0E	P	5 2 700	180	75	150	20 - -	-	979	292	16	10	CTRC	10	3
31	182130Z	14.6N 128.4E	P	8 5 700	30	70	340	20 100 360	5	971	283	17	10	ELIP	N-S 15x10	4
32	190015Z	14.7N 127.7E	SAT	(14.5/4.5 /01.0/24HRS)				PCN 1 DMSP								
33	190015Z	14.8N 127.8E	SAT	(14.5/4.5 / / MRS)				PCN 1 DMSP								
34	190109Z	14.1N 127.0E	SAT	(15.0/5.0 /01.0/24HRS)				NOAA-2								
35	190235Z	14.8N 127.0E	SAT	(11.0 DATA				PCN 1 DMSP								
36	190235Z	14.8N 126.6E	SAT	(15.0/5.0 /01.5/24HRS)				PCN 1 DMSP								
37	190630Z	14.9N 125.8E	LHUR	-				- POSSIBLE EYE, ELLIPTICAL AXIS 20/30, 50 PERCENT WALL CLOUD							14.4N 122.0E	5
38	190630Z	14.8N 125.8E	P	5 1 700	210	100	300	5 120 30	6	946	263	18	12	ELIP	N-S 10x7	5
39	190930Z	14.9N 125.4E	LHUR	-				- CIRCULAR EYE 10 NM DIAM, 80 PERCENT WALL CLOUD							14.4N 122.0E	
40	191000Z	14.9N 125.5E	LHUR	-				- CIRCULAR EYE 7 NM DIAM, 70 PERCENT WALL CLOUD							14.4N 122.0E	
41	191030Z	14.9N 125.4E	LHUR	-				- CIRCULAR EYE OPEN NW, 5 NM DIAM, 50 PERCENT WALL CLOUD							14.4N 122.0E	
42	191037Z	14.8N 125.3E	P	-				- 700 - -							14.4N 122.0E	5
43	191100Z	14.9N 125.2E	LHUR	-				- CIRCULAR EYE OPEN NW, 7 NM DIAM, 50 PERCENT WALL CLOUD							14.4N 122.0E	
44	191130Z	14.3N 125.2E	LHUR	-				- CIRCULAR EYE OPEN NW, 7 NM DIAM, 80 PERCENT WALL CLOUD							14.4N 122.0E	
45	191153Z	14.0N 125.0E	SAT	(11.0 DATA				NOAA-2							14.4N 122.0E	
46	191200Z	14.9N 125.1E	LHUR	-				- CIRCULAR EYE, 50 PERCENT WALL CLOUD							14.4N 122.0E	
47	191257Z	14.9N 124.9E	SAT	(11.0 DATA				PCN 5 DMSP								
48	191257Z	14.1N 122.8E	SAT	(11.0 DATA				PCN 5 DMSP								
49	191300Z	14.9N 124.9E	LHUR	-				- CIRCULAR EYE OPEN NW, 80 PERCENT WALL CLOUD							14.4N 122.0E	
50	191330Z	15.0N 124.8E	LHUR	-				- CIRCULAR EYE 8 NM DIAM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
51	191400Z	15.0N 124.7E	LHUR	-				- CIRCULAR EYE OPEN NW, 7 NM DIAM, 60 PERCENT WALL CLOUD							14.4N 122.0E	
52	191430Z	15.0N 124.6E	LHUR	-				- CIRCULAR EYE OPEN NW, 7 NM DIAM, 60 PERCENT WALL CLOUD							14.4N 122.0E	
53	191500Z	15.1N 124.4E	LHUR	-				- CIRCULAR EYE 8 NM DIAM, 100 PERCENT CONCENTRIC							14.4N 122.0E	
54	191517Z	15.4N 124.1E	SAT	(11.0 DATA				PCN 1 DMSP								
55	191517Z	15.0N 124.0E	SAT	(11.0 DATA				PCN 5 DMSP								
56	191530Z	15.2N 124.2E	LHUR	-				- CIRCULAR EYE OPEN NW, 9 NM DIAM, 70 PERCENT WALL CLOUD							14.4N 122.0E	5
57	191530Z	15.1N 124.3E	P	5 3 700	20	85	230	12 - -	-	952	268	15	12	CIRC	35	5
58	191630Z	15.2N 124.0E	LHUR	-				- CIRCULAR EYE 9 NM DIAM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
59	191700Z	15.3N 123.9E	LHUR	-				- CIRCULAR EYE OPEN NW, 7 NM DIAM, 90 PERCENT WALL CLOUD							14.4N 122.0E	
60	191800Z	15.3N 123.6E	LHUR	-				- CIRCULAR EYE 6 NM DIAM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
61	191830Z	15.3N 123.4E	LHUR	-				- ELLIPTICAL EYE 8x10 NM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
62	191900Z	15.3N 123.3E	LHUR	-				- ELLIPTICAL EYE 7x10 NM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
63	191930Z	15.3N 123.2E	LHUR	-				- ELLIPTICAL EYE 7x10 NM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
64	192032Z	15.3N 123.0E	P	2 2 700	350	80	290	20 - -	-	946	262	16	-	CTRC	8	6
65	192035Z	15.4N 122.9E	LHUR	-				- FAIR FIX, 10 DEG SPIRAL OVERLAY							15.2N 120.0E	
66	192100Z	15.4N 122.8E	LHUR	-				- CIRCULAR EYE OPEN NW, 8 NM DIAM, 90 PERCENT WALL CLOUD							15.2N 120.0E	
67	192105Z	15.4N 122.8E	LHUR	-				- FAIR FIX, POSSIBLE EYE, 10 DEG SPIRAL OVERLAY							15.2N 120.0E	
68	192135Z	15.6N 122.6E	LHUR	-				- FAIR FIX, POSSIBLE EYE, 10 DEG SPIRAL OVERLAY							15.2N 120.0E	
69	192207Z	15.5N 122.4E	LHUR	-				- FAIR FIX, POSSIBLE EYE, 15 DEG SPIRAL OVERLAY							15.2N 120.0E	
70	192215Z	15.6N 122.5E	LHUR	-				- CIRCULAR EYE 20 NM DIAM, 100 PERCENT WALL CLOUD							15.2N 120.0E	
71	192238Z	15.6N 122.3E	LHUR	-				- FAIR FIX, POSSIBLE EYE, 10 DEG SPIRAL OVERLAY							15.2N 120.0E	
72	192300Z	15.6N 122.3E	LHUR	-				- FAIR FIX, POSSIBLE EYE, 10 DEG SPIRAL OVERLAY							15.2N 120.0E	
73	192308Z	15.6N 122.2E	LHUR	-				- CIRCULAR EYE 20 NM DIAM, 100 PERCENT WALL CLOUD							15.2N 120.0E	
74	192330Z	15.6N 122.2E	LHUR	-				- CIRCULAR EYE OPEN NW, 20 NM DIAM, 90 PERCENT WALL CLOUD							15.2N 120.0E	
75	192357Z	15.3N 122.1E	SAT	(14.5/4.5 / / MRS)				PCN 3 DMSP								
76	192357Z	15.6N 122.0E	SAT	(14.5/5.0 / / MRS)				PCN 5 DMSP								
77	192357Z	15.5N 122.0E	SAT	(15.5/5.5 /00.5/24HRS)				PCN 3 DMSP								
78	192358Z	15.6N 122.4E	P	1 5 700	180	100	90	15 150 -	-	267	-	-	-	CIRC	18	6
79	200000Z	15.5N 122.1E	LHUR	-				- OVAL EYE, 15x20 NM NW/SE, 100 PERCENT WALL CLOUD							14.4N 122.0E	
80	200007Z	15.2N 122.0E	LHUR	-				- GOOD FIX, CIRCULAR EYE 25 NM DIAM, 80 PERCENT WALL CLOUD							15.2N 120.0E	
81	200036Z	15.3N 121.8E	LHUR	-				- GOOD FIX							15.2N 120.0E	
82	200100Z	15.6N 121.9E	LHUR	-				- OVAL EYE 15x22 NM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
83	200106Z	15.4N 121.7E	LHUR	-				- GOOD FIX, CIRCULAR EYE 25 NM DIAM							15.2N 120.0E	
84	200136Z	15.3N 121.6E	LHUR	-				- GOOD FIX, CIRCULAR EYE 25 NM DIAM							15.2N 120.0E	
85	200200Z	15.6N 121.8E	LHUR	-				- GOOD FIX, CIRCULAR EYE 17 NM DIAM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
86	200230Z	15.7N 121.7E	LHUR	-				- ELLIPTICAL EYE 13x17 NM NE/SW, 100 PERCENT WALL CLOUD							14.4N 122.0E	
87	200233Z	15.5N 121.7E	LHUR	-				- GOOD FIX, CIRCULAR EYE 20 NM DIAM							15.2N 120.0E	
88	200300Z	15.5N 122.0E	LHUR	-				- CIRCULAR EYE, 100 PERCENT WALL CLOUD							14.4N 122.0E	
89	200303Z	15.6N 121.6E	LHUR	-				- GOOD FIX, CIRCULAR EYE 18 NM DIAM							15.2N 120.0E	
90	200330Z	15.7N 121.5E	LHUR	-				- CIRCULAR EYE 13 NM DIAM, 100 PERCENT WALL CLOUD							14.4N 122.0E	
91	200335Z	15.6N 121.5E	LHUR	-				- GOOD FIX, CIRCULAR EYE 16 NM DIAM							15.2N 120.0E	
92	200358Z	15.7N 121.4E	SAT	(11.0 DATA				PCN 5 DMSP								
93	200400Z	15.8N 121.4E	LHUR	-				- ELLIPTICAL EYE, NE/SW 13x15 NM, 100 PERCENT WALL CLOUD							15.2N 120.0E	
94	200402Z	15.6N 121.4E	LHUR	-				- GOOD FIX, CIRCULAR EYE 5 NM DIAM, 80 PERCENT WALL CLOUD							15.2N 120.0E	
95	200433Z	15.7N 121.3E	LHUR	-												

TYPHOON IVY  
FIX POSITIONS FOR CYCLONE NO. 12  
0600Z 17 JUL TO 1800Z 22 JUL

FIX NO.	TIME	POS11	FIX CAT	ACCRY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND				MAX OBS SFC WIND			OBS MIN SLP	MIN T00MB	FLT LVL	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMbK
						DIR	VEL	BNG	RNG	VEL	BNG	RNG								
101	200808Z	16.1N 120.3E	LMDR	-	FAIR FIX, POSSIBLY	EYE, 15	UEG	SPIRAL	OUEMLAY										15.2N 120.6E	
102	200938Z	16.3N 119.9E	LMDR	-	POOR FIX, POSSIBLY	EYE, 15	UEG	SPIRAL	OUEMLAY										15.2N 120.6E	
103	201009Z	16.3N 120.0E	LMDR	-	FAIR FIX, POSSIBLY	EYE, 15	UEG	SPIRAL	OUEMLAY										15.2N 120.6E	
104	201239Z	16.7N 119.0E	SAT	(IR DATA	)	PCN 5	DMSP													
105	201239Z	16.6N 118.4E	SAT	(IR DATA	)	PCN 5	DMSP													
106	201247Z	17.0N 119.0E	SAT	(IR DATA	)	NOAA-2			(CONF 03)											
107	201252Z	17.3N 118.3E	P	1 15	700	160	80	40	13	-	-	989	298	12 11	-	-	-			7
108	201639Z	17.7N 118.2E	SAT	(IR DATA	)	PCN 5	DMSP													
109	202215Z	17.6N 117.0E	P	5 2	700	270	50	110	35	60	00	30	975	291	12 11	CTMC	35			7
110	202338Z	17.5N 116.9E	SAT	(IR DATA	)	PCN 5	DMSP													
111	202339Z	18.0N 117.1E	SAT	(T4.5/4.5 / S1.0/24HRS)		PCN 3	DMSP													
112	210103Z	18.0N 116.0E	SAT	(T5.0/5.0 / D0.5/24HRS)		NOAA-2			(CONF 01)											
113	210120Z	17.9N 116.5E	SAT	(T5.0/5.0 / D0.5/24HRS)		PCN 1	DMSP													
114	210339Z	18.1N 115.9E	SAT	(T5.0/5.0 / D0.5/24HRS)		PCN 1	DMSP													
115	210339Z	18.4N 116.1E	SAT	(T4.5/4.5 / / HRS)		PCN 1	DMSP													
116	210900Z	18.7N 114.9E	LMDR	-	2080/														22.3N 114.2E	
117	211035Z	18.9N 114.9E	P	5 2	700	140	100	70	40	100	70	55	967	281	15 10	ELIP SW-NE	25X23			8
118	211200Z	18.9N 114.4E	LMDR	-	2777														22.3N 114.2E	
119	211344Z	20.0N 115.0E	SAT	(IR DATA	)	NOAA-2			(CONF 02)											
120	211402Z	19.4N 114.2E	SAT	(IR DATA	)	PCN 5	DMSP													
121	211435Z	19.2N 114.2E	P	5 2	700	-	-	-	-	-	-	-	965	279	17	ELIP E-W	30X27			8
122	211500Z	19.2N 114.0E	LMDR	-	2077														22.3N 114.2E	
123	211621Z	19.6N 113.9E	SAT	(IR DATA	)	PCN 5	DMSP													
124	212100Z	19.8N 113.2E	LMDR	-	2777														22.3N 114.2E	
125	220000Z	20.2N 112.9E	LMDR	-	10577														22.3N 114.2E	
126	220100Z	20.2N 112.8E	SAT	(T5.5/5.5 / D0.5/24HRS)		PCN 1	DMSP													
127	220300Z	20.4N 112.7E	LMDR	-	10577														22.3N 114.2E	
128	220321Z	20.4N 112.4E	SAT	(T5.5/5.5 / D0.5/24HRS)		PCN 1	DMSP													
129	220321Z	20.3N 112.1E	SAT	(T6.0/6.0 / / HRS)		PCN 1	DMSP													
130	220600Z	20.9N 112.2E	LMDR	-	10837														22.3N 114.2E	
131	220900Z	21.3N 111.9E	LMDR	-	10857														22.3N 114.2E	
132	221200Z	21.6N 111.3E	LMDR	-	10757														22.3N 114.2E	
133	221244Z	21.8N 111.5E	SAT	(IR DATA	)	NOAA-2													22.3N 114.2E	
134	221602Z	21.4N 111.0E	SAT	(IR DATA	)	PCN 5	DMSP													
135	221602Z	21.8N 110.9E	SAT	(IR DATA	)	PCN 5	DMSP													
136	221602Z	22.8N 111.3E	SAT	(IR DATA	)	PCN 1	DMSP													

TROPICAL STORM KIM  
FIX POSITIONS FOR CYCLONE NO. 13  
0000Z 23 JUL TO 0600Z 24 JUL

FIX NO.	TIME	POS11	FIX CAT	ACCRY	FIX	MAX OBS				MAX OBS			OBS	MIN	FLT	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMbK
				NAV-MET	LVL	DIR	VEL	BKG	RNG	SFC	WIND	VEL	BKG	RNG	SLP					
1	202157Z	17.6N 105.1E	SAT		(T1.0/1.0 / / HRS)					PCN 5	DMSP									
2	210016Z	18.5N 105.4E	SAT		(IR DATA						PCN 5	DMSP								
3	211039Z	19.7N 104.4E	SAT		(IR DATA						PCN 5	DMSP								
4	211258Z	19.9N 104.3E	SAT		(IR DATA						PCN 5	DMSP								
5	212139Z	20.9N 104.8E	SAT		(T1.0/1.0 /S /24HRS)						PCN 3	DMSP								
6	221021Z	20.8N 105.3E	SAT		(IR DATA						PCN 5	DMSP								
7	222107Z	23.2N 107.1E	SAT		(T3.0/3.0 /D2.0/24HRS)						NOAA-2		(CONF 01)							
8	222120Z	23.0N 107.3E	SAT		(T1.5/1.5 /D0.5/24HRS)						PCN 6	DMSP								
9	222339Z	23.0N 105.3E	SAT		(T1.5/1.5 / / HRS)						PCN 5	DMSP								
10	230120Z	23.3N 106.1E	SAT		(IR DATA						PCN 5	DMSP								
11	230950Z	24.5N 109.0E	SAT		(IR DATA						NOAA-2		(CONF 02)							
12	231002Z	23.5N 108.0E	SAT		(IR DATA						PCN 6	DMSP								
13	232102Z	25.8N 107.9E	SAT		(T2.0/2.0 /S0.5/24HRS)						PCN 3	DMSP								
14	232201Z	26.0N 108.4E	SAT		(T3.5/3.5 /S /24HRS)						NOAA-2		(CONF 01)							
15	232320Z	26.2N 107.7E	SAT		(T3.0/3.0 /D0.5/24HRS)						PCN 4	DMSP								
16	240102Z	26.7N 107.2E	SAT		(IR DATA						PCN 3	DMSP								
17	240102Z	26.8N 107.2E	SAT		(T2.0/2.0 / / HRS)						PCN 4	DMSP								
18	240102Z	25.5N 106.7E	SAT		(T2.0/2.0 /D0.5/24HRS)						PCN 3	DMSP								
19	240320Z	27.2N 106.3E	P	13	7	700	180	65	30		25	65	30	25	989	301	10	-	-	2
20	241047Z	26.8N 104.0E	SAT		(IR DATA						NOAA-2		(CONF 02)							
21	241344Z	26.5N 103.4E	SAT		(IR DATA						PCN 6	DMSP								

TROPICAL STORM LUCY  
FIX POSITIONS FOR CYCLONE NO. 14  
0000Z 09 AUG TO 0600Z 11 AUG

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL	MAX OBS SFC WIND DIR VEL	MAX OBS SFC WIND DIR VEL	UWS MIN SLP	MIN 700MB MGT	FLI LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF HAUAH	MSN NMGR
1	040242Z	12.2N 134.0E	SAT	(11.0/1.0 / / HRS)				PCN 5 DMSP								
2	041128Z	14.0N 130.9E	SAT	(1R DATA)				PCN 5 DMSP								
3	041309Z	13.2N 126.3E	SAT	(1R DATA)				PCN 6 DMSP								
4	041524Z	13.6N 129.2E	SAT	(1R DATA)				PCN 5 DMSP								
5	041524Z	13.2N 129.0E	SAT	(1R DATA)				PCN 6 DMSP								
6	050009Z	16.6N 124.5E	SAT	(11.5/1.5 / / HRS)				PCN 5 DMSP								
7	050009Z	16.0N 124.3E	SAT	(11.5/1.5 /00.5/24HRS)				PCN 5 DMSP								
8	050225Z	16.4N 123.8E	SAT	(1R DATA)				PCN 5 DMSP								
9	051251Z	14.9N 122.9E	SAT	(1R DATA)				PCN 5 DMSP								
10	051505Z	15.0N 122.6E	SAT	(1R DATA)				PCN 5 DMSP								
11	052451Z	16.6N 121.6E	SAT	(11.0/1.5 /00.5/24HRS)				PCN 5 DMSP								
12	060522Z	11.0N 134.9E	SAT	(1R DATA)				NOAA-2								(CONF 03)
13	080310Z	19.6N 118.6E	SAT	(11.0/1.0 / / HRS)				PCN 5 DMSP								
14	081338Z	18.0N 116.3E	SAT	(1R DATA)				PCN 5 DMSP								
15	081551Z	17.4N 117.9E	SAT	(1R DATA)				PCN 5 DMSP								
16	081551Z	17.7N 117.8E	SAT	(1R DATA)				PCN 5 DMSP								
17	090038Z	18.2N 117.2E	SAT	(11.0/1.0 / / HRS)				PCN 5 DMSP								
18	090115Z	19.0N 118.0E	SAT	(12.0/2.0 /01.0/24HRS)				NOAA-2								(CONF 02)
19	090251Z	18.3N 117.9E	SAT	(11.5/1.5 / / HRS)				PCN 5 DMSP								
20	090251Z	18.7N 117.4E	SAT	(11.5/1.5 /00.5/24HRS)				PCN 3 DMSP								
21	090305Z	18.9N 119.2E	P	15 5 1500 50 25 330				30 25 330	30	994	-	26	-	-	-	1
22	090433Z	18.6N 118.9E	P	10 5 700 230 50 170				150 4 170	30	-	305	14	-	-	-	3
23	090955Z	19.7N 119.6E	P	10 5 700 230 50 170				150 4 170	30	-	305	14	-	-	-	3
24	091319Z	20.2N 119.3E	P	10 5 700 230 50 170				150 4 170	30	-	305	14	-	-	-	3
25	091431Z	20.7N 119.9E	P	3 20 700 - - -				- - -	9	973	61	30	-	-	-	3
26	091532Z	20.4N 119.2E	SAT	(1R DATA)				PCN 5 DMSP								
27	091533Z	21.0N 119.6E	SAT	(1R DATA)				PCN 5 DMSP								
28	092532Z	20.2N 119.4E	P	1 5 1500 240 40 160 150				25 150	35	997	-	24	-	-	-	3
29	100019Z	22.2N 119.2E	SAT	(13.0/3.0 /02.0/24HRS)				PCN 5 DMSP								
30	100019Z	21.9N 118.9E	SAT	(11.5/1.5 /5 /21HRS)				PCN 5 DMSP								
31	100019Z	22.5N 119.4E	SAT	(12.5/2.5 /01.0/21HRS)				PCN 3 DMSP								
32	100208Z	23.5N 120.3E	SAT	(13.0/3.0 /01.0/25HRS)				NOAA-2								(CONF 02)
33	100414Z	22.8N 118.9E	SAT	(1R DATA)				PCN 5 DMSP								
34	100414Z	22.5N 120.1E	SAT	(13.0/3.0 / / HRS)				PCN 5 DMSP								
35	101257Z	23.0N 118.9E	SAT	(1R DATA)				NOAA-2								(CONF 02)
36	101301Z	22.7N 119.5E	SAT	(1R DATA)				PCN 5 DMSP								
37	101301Z	22.5N 119.2E	SAT	(1R DATA)				PCN 6 DMSP								
38	101301Z	22.8N 119.7E	SAT	(1R DATA)				PCN 5 DMSP								
39	110001Z	23.5N 118.6E	SAT	(12.0/2.0 /00.5/24HRS)				PCN 5 DMSP								
40	110001Z	23.6N 118.6E	SAT	(12.0/2.5 /00.5/24HRS)				PCN 3 DMSP								
41	110109Z	23.8N 118.0E	SAT	(12.5/3.0 /00.5/24HRS)				NOAA-2								(CONF 01)
42	110356Z	24.4N 119.1E	SAT	(13.0/3.0 /5 /28HRS)				PCN 3 DMSP								
43	111243Z	24.8N 119.2E	SAT	(1R DATA)				PCN 5 DMSP								
44	111243Z	24.6N 118.7E	SAT	(1R DATA)				PCN 5 DMSP								
45	111243Z	24.9N 118.7E	SAT	(1R DATA)				PCN 6 DMSP								
46	112343Z	25.7N 117.9E	SAT	(1R DATA)				PCN 5 DMSP								

TYPHOON MARY  
FIX POSITIONS FOR CYCLONE NO. 15  
0600Z 11 AUG TO 0600Z 26 AUG

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL	MAX OBS SFC WIND DIR VEL	MAX OBS SFC WIND DIR VEL	UWS MIN SLP	MIN 700MB MGT	FLI LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF HAUAH	MSN NMGR
1	090110Z	14.0N 148.0E	SAT	(11.0/1.0 / / HRS)				PCN 5 DMSP								
2	092238Z	15.3N 150.3E	SAT	(11.5/1.5 /00.5/24HRS)				PCN 5 DMSP								
3	100051Z	15.2N 150.8E	SAT	(1R DATA)				PCN 6 DMSP								
4	101333Z	15.5N 150.6E	SAT	(1R DATA)				PCN 6 DMSP								
5	102219Z	15.4N 150.2E	SAT	(11.5/1.5 /5 /24HRS)				PCN 5 DMSP								
6	110214Z	15.5N 150.3E	SAT	(1R DATA)				PCN 5 DMSP								
7	110745Z	15.7N 151.1E	P	10 10 1500 100 35 20				120 35 20	120	995	-	23	24	-	-	1
8	110840Z	15.6N 150.9E	P	10 10 1500 100 35 20				120 35 20	120	995	-	23	24	-	-	1
9	111101Z	14.8N 151.3E	SAT	(1R DATA)				PCN 5 DMSP								
10	111101Z	14.7N 151.1E	SAT	(1R DATA)				PCN 6 DMSP								
11	111314Z	14.9N 151.2E	SAT	(1R DATA)				PCN 6 DMSP								
12	111330Z	16.5N 150.1E	P	8 10 700 50 25 330				70 - -	-	994	303	14	11	-	-	1
13	112201Z	17.7N 154.3E	SAT	(13.0/3.0 /01.5/24HRS)				PCN 5 DMSP								
14	112215Z	17.5N 154.2E	SAT	(12.5/2.5 /01.0/23HRS)				NOAA-2								(CONF 01)
15	120155Z	18.2N 154.0E	SAT	(1R DATA)				PCN 5 DMSP								
16	120155Z	17.3N 153.8E	SAT	(12.0/2.0 / / HRS)				PCN 6 DMSP								
17	120234Z	18.1N 152.3E	P	5 3 700 160 45 120				25 60 360	50	989	301	13	-	-	-	2
18	120530Z	18.1N 152.2E	P	5 5 700 160 45 20				25 60 360	50	991	301	13	-	-	-	2
19	120920Z	19.3N 151.5E	P	3 6 700 40 35 290				80 40 270	60	993	302	13	11	-	-	4
20	121043Z	19.8N 153.5E	SAT	(1R DATA)				PCN 6 DMSP								
21	121043Z	20.4N 153.9E	SAT	(1R DATA)				PCN 6 DMSP								
22	121055Z	19.0N 154.0E	SAT	(1R DATA)				NOAA-2								(CONF 01)
23	121437Z	20.1N 152.9E	SAT	(1R DATA)				PCN 5 DMSP								
24	121437Z	20.2N 153.8E	SAT	(1R DATA)				PCN 6 DMSP								
25	121458Z	19.4N 150.0E	P	3 6 700 80 62 360				60 - -	-	989	300	14	12	-	-	4
26	122100Z	19.9N 149.6E	P	5 4 700 230 25 230				40 25 260	15	991	300	12	-	-	-	5
27	122143Z	22.2N 151.9E	SAT	(14.0/4.0 /01.0/24HRS)				PCN 5 DMSP								
28	122143Z	24.8N 151.4E	SAT	(13.5/3.5 /01.5/20HRS)				PCN 6 DMSP								
29	122310Z	21.5N 151.5E	SAT	(13.5/3.5 /01.0/25HRS)				NOAA-2								(CONF 01)
30	130137Z	22.8N 151.2E	SAT	(1R DATA)				PCN 5 DMSP								
31	130137Z	22.4N 151.4E	SAT	(1R DATA)				PCN 5 DMSP								
32	130320Z	20.0N 147.2E	P	- - 700 - - -				- - -	-	984	-	23	-	-	-	6
33	130830Z	21.1N 148.5E	P	8 20 1500 270 20 170				15 - -	-	-	-	-	-	-	-	6
34	130955Z	22.0N 147.5E	SAT	(1R DATA)				NOAA-2								(CONF 01)
35	131025Z	24.0N 149.8E	SAT	(1R DATA)				PCN 6 DMSP								
36	131025Z	24.0N 150.4E	SAT	(1R DATA)				PCN 6 DMSP								
37	131418Z	25.2N 149.1E	SAT	(1R DATA)				PCN 6 DMSP								
38	131418Z	24.8N 148.1E	SAT	(1R DATA)				PCN 6 DMSP								
39	132406Z	22.5N 146.8E	SAT	(12.5/3.5 /01.5/24HRS)				PCN 3 DMSP								
40	132406Z	22.4N 146.9E	SAT	(11.0/1.0 / / HRS)				PCN 5 DMSP								
41	132406Z	25.3N 144.9E	SAT	(12.0/3.0 /01.5/25HRS)				PCN 5 DMSP								
42	140118Z	23.5N 145.0E	SAT	(1R DATA)				PCN 3 DMSP								
43	140118Z	23.5N 145.4E	SAT	(1R DATA)				PCN 3 DMSP								
44	140558Z	24.3N 144.8E	P	10 10 700 20 60 310				120 55 240	973	287	10	14	-	-	-	8
45	140900Z	24.7N 143.8E	P	10 5 700 260 50 180				60 50 240	125	976	287	11	11	-	-	8

TYPHOON MARY  
FIX POSITIONS FOR CYCLONE NO. 15  
0600Z 11 AUG TO 0600Z 26 AUG

[illegible]

TYPHOON MARY  
FIX POSITIONS FOR CYCLONE NO. 15  
0600Z 11 AUG TO 0600Z 26 AUG

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	FLT DIR	MAX OBS VEL	MAX OBS BKG RNG	SFC WIND VEL	UBS WIND BKG RNG	UBS MIN SLP	MIN /00MB HGT	FLT LVL	EYE FORM	UNCLN- TATION	EYE DIA	POSIT UP	MSK
144	230408Z	27.0N 124.6E	SAT	(1M DATA					PCN 5	DMSP								
145	231012Z	27.8N 126.6E	SAT	(1M DATA					PCN 4	DMSP								
146	231012Z	27.5N 125.8E	SAT	(1M DATA					PCN 5	DMSP								
147	231012Z	27.5N 125.8E	SAT	(1M DATA					PCN 5	DMSP								
148	231130Z	28.0N 127.0E	SAT	(1M DATA					PCN 5	DMSP								
149	231227Z	28.0N 126.4E	SAT	(1M DATA					PCN 3	DMSP								
150	231227Z	27.7N 126.1E	SAT	(1M DATA					PCN 5	DMSP								
151	231617Z	27.3N 126.4E	SAT	(1M DATA					PCN 5	DMSP								
152	231617Z	27.3N 126.8E	SAT	(1M DATA					PCN 3	DMSP								
153	231640Z	26.8N 126.6E	LMNR	- POOR FIX, 10 DEG SPIRAL OVERLAY													26.4N 127.8E	
154	231800Z	26.7N 126.7E	LMNR	- POOR FIX, 10 DEG SPIRAL OVERLAY													26.4N 127.8E	
155	231850Z	26.7N 126.8E	LMNR	- FAIR FIX, POSSIBLE EYE, 10 DEG SPIRAL OVERLAY													26.4N 127.8E	
156	232000Z	27.0N 126.6E	LMNR	- 6777													26.1N 127.8E	
157	232100Z	27.0N 126.7E	LMNR	- 6777													26.1N 127.8E	
158	232113Z	27.0N 127.0E	SAT	(1M DATA					PCN 5	DMSP								
159	232200Z	26.9N 126.9E	LMNR	- 6777													26.1N 127.8E	
160	232300Z	26.9N 127.2E	LMNR	- 6777													26.1N 127.8E	
161	232327Z	26.8N 127.7E	SAT	(12.5/2.5 / 01.5/2.5HRS)					PCN 3	DMSP								
162	232327Z	26.8N 127.3E	SAT	(13.0/3.0 / 01.5/2.5HRS)					PCN 1	DMSP								
163	240100Z	26.8N 127.4E	LMNR	- 6777													26.4N 129.5E	
164	240105Z	26.7N 127.7E	LMNR	- GOOD FIX, 10 DEG SPIRAL OVERLAY													26.4N 127.8E	
165	240133Z	26.3N 127.0E	SAT	(12.5/2.5 / 01.0/2.5HRS)					NOAA-2									
166	240200Z	26.8N 127.4E	LMNR	- 6777													26.4N 129.5E	
167	240200Z	26.6N 127.7E	LMNR	- 25/02													26.1N 127.8E	
168	240300Z	26.5N 127.8E	LMNR	- 21072													26.1N 127.8E	
169	240317Z	26.4N 127.5E	SAT	(1M DATA					PCN 3	DMSP								
170	240317Z	26.6N 128.1E	SAT	(1M DATA					PCN 3	DMSP								
171	240317Z	26.4N 127.7E	SAT	(13.0/3.0 / 01.5/2.5HRS)					PCN 3	DMSP								
172	240400Z	26.7N 128.1E	LMNR	- 6777													26.4N 129.5E	
173	240400Z	26.3N 128.2E	LMNR	- 5772													26.1N 127.8E	
174	240500Z	26.3N 128.4E	LMNR	- 5771													26.1N 127.8E	
175	240500Z	26.1N 128.6E	LMNR	- 10305													26.4N 129.5E	
176	240500Z	26.5N 128.5E	LMNR	- 15 DEG SPIRAL OVERLAY													26.4N 127.8E	
177	240555Z	26.3N 128.7E	P 2	5 100 340 25 240 20 30 10 25 480 291 10 13 CTNC														16
178	240700Z	26.0N 128.8E	LMNR	- 5777													26.1N 127.8E	
179	240710Z	26.3N 128.6E	LMNR	- GOOD FIX, HVT ATTN. 15 DEG SPIRAL OVERLAY													26.4N 127.8E	
180	240745Z	26.3N 128.7E	LMNR	- FAIR FIX, 10 DEG SPIRAL OVERLAY													26.4N 127.8E	
181	240800Z	26.2N 129.0E	LMNR	- POOR FIX													26.4N 127.7E	
182	240810Z	26.2N 129.2E	LMNR	- FAIR FIX, HVT ATTN													26.4N 127.8E	
183	240830Z	26.1N 129.2E	P 2	5 100 210 35 160 30 55 190 30 975 290 10 12 CTNC														16
184	240843Z	26.2N 129.3E	LMNR	- FAIR FIX, HVT ATTN. 10 DEG SPIRAL OVERLAY													26.4N 127.8E	
185	240900Z	26.1N 129.4E	LMNR	- 52713													26.4N 129.5E	
186	240900Z	26.2N 129.3E	LMNR	- 5777													26.1N 127.8E	
187	240911Z	26.2N 129.3E	LMNR	- FAIR FIX, HVT ATTN. 15 DEG SPIRAL OVERLAY													26.4N 127.8E	
188	240938Z	26.1N 129.4E	LMNR	- FAIR FIX, HVT ATTN. 20 DEG SPIRAL OVERLAY													26.4N 127.8E	
189	240956Z	26.2N 129.8E	SAT	(1M DATA					PCN 4	DMSP								
190	240956Z	25.5N 128.6E	SAT	(1M DATA					PCN 6	DMSP								
191	241000Z	26.0N 129.6E	LMNR	- 6777													26.1N 127.8E	
192	241000Z	26.1N 129.3E	LMNR	- POOR FIX													26.4N 127.7E	
193	241008Z	26.0N 129.6E	LMNR	- FAIR FIX, HVT ATTN. 15 DEG SPIRAL OVERLAY													26.4N 127.8E	
194	241042Z	26.0N 129.6E	LMNR	- FAIR FIX, HVT ATTN. 15 DEG SPIRAL OVERLAY													26.4N 129.5E	
195	241108Z	26.1N 129.8E	LMNR	- 50713													26.4N 127.8E	
196	241110Z	25.8N 129.8E	LMNR	- FAIR FIX, HVT ATTN. 20 DEG SPIRAL OVERLAY														
197	241138Z	25.9N 129.8E	SAT	(1M DATA					PCN 3	DMSP								
198	241200Z	25.9N 130.1E	LMNR	- 6777													26.1N 127.8E	
199	241208Z	26.0N 130.4E	SAT	(1M DATA					PCN 3	DMSP								
200	241208Z	26.3N 129.8E	SAT	(1M DATA					PCN 3	DMSP								
201	241210Z	25.9N 130.3E	LMNR	- FAIR FIX, HVT ATTN. F.B. BECOMING DIFFUSE AND BREAKING UP													26.4N 127.8E	
202	241236Z	25.9N 130.3E	LMNR	- POOR FIX, HVT ATTN. F.B. DIFFUSE, 15 DEG SPIRAL OVERLAY													26.4N 127.8E	
203	241300Z	26.0N 130.3E	LMNR	- 6777													26.1N 127.8E	
204	241400Z	26.1N 130.5E	LMNR	- 6777													26.1N 127.8E	
205	241447Z	25.9N 130.6E	P 2	1 700 220 05 110 20 - - - 475 290 10 13 - - -														17
206	241500Z	26.1N 130.8E	LMNR	- 6777													26.1N 127.8E	
207	241559Z	25.6N 130.6E	SAT	(1M DATA					PCN 3	DMSP								
208	241559Z	26.1N 130.3E	SAT	(1M DATA					PCN 5	DMSP								
209	242000Z	26.3N 131.9E	LMNR	- 52763													26.4N 129.5E	
210	242058Z	26.4N 131.5E	SAT	(14.0/4.0 / 01.0/2.5HRS)					PCN 5	DMSP								
211	242141Z	26.6N 132.1E	P 1	1 700 300 75 200 22 60 240 10 964 281 10 15 CTNC														17
212	242308Z	26.3N 132.5E	SAT	(13.0/3.0 / 00.5/2.5HRS)					PCN 5	DMSP								
213	242308Z	26.1N 132.1E	SAT	(1M DATA					PCN 3	DMSP								
214	250034Z	26.4N 132.6E	SAT	(13.5/3.5 / 5 / 2.5HRS)					NOAA-2									
215	250259Z	27.4N 133.5E	SAT	(1M DATA					PCN 1	DMSP								
216	250259Z	27.1N 133.1E	SAT	(1M DATA					PCN 3	DMSP								
217	250941Z	28.8N 134.7E	SAT	(1M DATA					PCN 6	DMSP								
218	251025Z	29.4N 135.5E	P 5	5 700 280 00 220 60 60 180 110 972 287 10 - - - -														18
219	251150Z	29.6N 135.6E	SAT	(1M DATA					PCN 4	DMSP								
220	251150Z	29.4N 135.1E	SAT	(1M DATA					PCN 5	DMSP								
221	251300Z	31.0N 136.4E	P 5	5 700 240 00 180 25 - - - 973 288 10 12 ELIP SE-NW -														19
222	251540Z	30.9N 135.6E	SAT	(1M DATA					PCN 5	DMSP								
223	252042Z	32.9N 137.1E	SAT	(13.0/4.0 / 01.0/2.5HRS)					PCN 5	DMSP								
224	252100Z	33.1N 137.2E	LMNR	- 35972													35.3N 138.7E	
225	252200Z	33.8N 137.6E	LMNR	- 35971													35.3N 138.7E	
226	252200Z	33.5N 137.2E	LMNR	- 35971													35.8N 139.4E	
227	252210Z	33.8N 137.5E	LMNR	-														
228	252250Z	33.9N 137.3E	SAT	(12.0/3.0 / 01.0/2.5HRS)					PCN 5	DMSP								
229	252250Z	34.2N 137.0E	SAT	(1M DATA					PCN 5	DMSP								
230	252300Z	34.1N 137.4E	LMNR	- 52717													35.3N 138.7E	
231	252300Z	33.9N 137.3E	LMNR	- 65931													35.3N 138.7E	
232	252311Z	34.0N 135.9E	SAT	(12.0/3.5 / 01.5/2.5HRS)					NOAA-2									
233	260020Z	34.5N 138.0E	LMNR	-													35.8N 139.4E	
234	260100Z	34.8N 137.6E	LMNR	- 24847													35.3N 138.7E	
235	260120Z	35.2N 138.2E	LMNR	-													35.8N 139.4E	
236	260200Z	35.5N 137.8E	LMNR	- 10971														



TROPICAL DEPRESSION 16  
FIX POSITIONS FOR CYCLONE NO. 16  
0600Z 14 AUG TO 0600Z 15 AUG

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATION	EYE DIA	POSIT OF KAUAI	MSN NMHR
1	141244Z	16.2N 109.0E	SAT	(1H DATA			1 N04A-2								
2	150030Z	16.8N 107.8E	SAT	(12.5/2.5 / D1.5/24HRS)			PCN 5 UMSP								
3	150030Z	16.9N 107.7E	SAT	(12.0/2.0 / HRS)			PCN 5 UMSP								
4	150423Z	16.6N 107.0E	SAT	(1H DATA			PCN 5 UMSP								

TROPICAL STORM NADINE  
FIX POSITIONS FOR CYCLONE NO. 17  
0600Z 15 AUG TO 1700Z 18 AUG

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATION	EYE DIA	POSIT OF KAUAI	MSN NMHR
1	150030Z	16.3N 127.1E	SAT	(12.0/2.0 / HRS)			PCN 5 UMSP								
2	150102Z	16.8N 126.8E	SAT	(11.5/1.5 /D0.5/24HRS)			N04A-2			(CONF 02)					
4	150241Z	16.3N 127.1E	SAT	(1H DATA			PCN 5 UMSP								
4	151144Z	16.0N 131.0E	SAT	(1H DATA			N04A-2			(CONF 02)					
5	151430Z	15.6N 131.6E	P	10 20 700 350 35 270			30 - -		997	303	10 10	- - -			
6	151523Z	15.5N 131.5E	SAT	(1H DATA			PCN 5 UMSP								
7	151523Z	15.6N 131.6E	SAT	(1H DATA			PCN 5 UMSP								
8	152134Z	15.5N 136.8E	SAT	(1H DATA			PCN 3 UMSP								
9	152325Z	15.6N 135.5E	P	2 5 700 300 55 250			60 60 140	30	982	295	10 14	- - -			
10	160011Z	15.8N 135.6E	SAT	(13.0/3.0 /D1.0/24HRS)			PCN 3 UMSP								
11	160011Z	15.8N 135.9E	SAT	(13.0/3.0 / HRS)			PCN 3 UMSP								
12	160223Z	16.0N 136.3E	SAT	(1H DATA			PCN 3 UMSP								
13	160223Z	15.9N 136.5E	SAT	(13.0/3.0 / HRS)			PCN 3 UMSP								
14	160240Z	16.3N 136.5E	P	1 4 700 260 50 160			35 55 140	70	985	296	14 11	- - -			
15	160825Z	17.3N 138.7E	P	10 2 1500 220 45 130			100 4 130	60	988	-	25 23	- - -			
16	161018Z	17.6N 138.9E	SAT	(1H DATA			PCN 6 UMSP								
17	161046Z	18.0N 139.0E	SAT	(1H DATA			N04A-2								
18	161111Z	17.7N 138.8E	SAT	(1H DATA			PCN 5 UMSP								
19	161111Z	17.6N 138.6E	SAT	(1H DATA			PCN 6 UMSP								
20	16136Z	18.6N 140.3E	P	10 5 700 220 40 140			70 - -		996	304	13 11	- - -			
21	161504Z	18.8N 139.9E	SAT	(1H DATA			PCN 5 UMSP								
22	161504Z	18.2N 139.1E	SAT	(1H DATA			PCN 6 UMSP								
23	162211Z	20.9N 141.5E	SAT	(13.5/3.5 /D0.5/25HRS)			PCN 3 UMSP								
24	162211Z	20.9N 141.2E	SAT	(11.5/2.5 /D1.5/24HRS)			PCN 4 UMSP								
25	170204Z	22.3N 141.8E	SAT	(1H DATA			PCN 3 UMSP								
26	170204Z	21.7N 141.3E	SAT	(1H DATA			PCN 3 UMSP								
27	170325Z	22.3N 141.6E	P	5 5 700 180 50 90			18 85 30	10	990	302	17 12	- - -			
28	171002Z	23.8N 141.1E	SAT	(1H DATA			PCN 6 UMSP								
29	171053Z	23.7N 141.3E	SAT	(1H DATA			PCN 6 UMSP								
30	171053Z	23.9N 140.3E	SAT	(1H DATA			PCN 6 UMSP								
31	171446Z	24.2N 141.0E	SAT	(1H DATA			PCN 5 UMSP								
32	171446Z	24.2N 140.6E	SAT	(1H DATA			PCN 3 UMSP								
33	172104Z	29.1N 140.6E	SAT	(1H DATA			PCN 3 UMSP								
34	172153Z	29.3N 140.7E	SAT	(12.5/3.5 /D1.0/24HRS)			PCN 3 UMSP								
35	172153Z	29.3N 140.7E	SAT	(12.5/2.5 /D1.0/24HRS)			PCN 3 UMSP								
36	172355Z	29.9N 140.4E	SAT	(1H DATA			PCN 3 UMSP								
37	172355Z	30.0N 139.8E	SAT	(1H DATA			PCN 3 UMSP								
38	180146Z	30.6N 140.1E	SAT	(1H DATA			PCN 3 UMSP								
39	180146Z	30.7N 140.5E	SAT	(1H DATA			PCN 3 UMSP								
40	180520Z	30.8N 139.8E	P	5 5 500 200 20 250			25 360	20	1002	-	24 -	- - -			
41	180947Z	32.2N 138.9E	SAT	(1H DATA			PCN 6 UMSP								
42	181216Z	32.6N 138.4E	SAT	(1H DATA			PCN 6 UMSP								
43	182316Z	32.2N 137.2E	SAT	(1H DATA			PCN 3 UMSP								

TYPHOON POLLY  
FIX POSITIONS FOR CYCLONE NO. 19  
1200Z 25 AUG TO 0000Z 02 SEP

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS			MAX OBS			OBS MIN SLP	MIN MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATION	EYE DIA	POSIT OF KAUAI	MSN NMHR
						FLT LVL	WIND DIR	WIND VEL	SFC WIND VEL	BRG	RNG								
1	230013Z	21.2N 160.8E	SAT	(11.5/1.5 / HRS)					PCN 6	UMSP									
2	230830Z	19.6N 159.2E	SAT	(1H DATA)					PCN 6	UMSP									
3	231045Z	19.6N 159.1E	SAT	(1H DATA)					PCN 5	UMSP									
4	232113Z	19.7N 154.1E	SAT	(1H DATA)					PCN 5	UMSP									
5	232145Z	18.2N 154.2E	SAT	(11.5/1.5 / 5 / 24HRS)					PCN 3	UMSP									
6	240136Z	19.2N 153.4E	SAT	(1H DATA)					PCN 5	UMSP									
7	240814Z	16.2N 157.0E	SAT	(1H DATA)					PCN 5	UMSP									
8	241027Z	16.1N 156.4E	SAT	(1H DATA)					PCN 5	UMSP									
9	241417Z	15.5N 150.2E	SAT	(1H DATA)					PCN 5	UMSP									
10	241417Z	16.5N 153.7E	SAT	(1H DATA)					PCN 6	UMSP									
11	242050Z	17.3N 150.9E	SAT	(12.0/2.0 / 100.5/24HRS)					PCN 3	UMSP									
12	242308Z	17.4N 150.5E	SAT	(1H DATA)					PCN 3	UMSP									
13	250117Z	17.2N 150.0E	SAT	(1H DATA)					PCN 5	UMSP									
14	250117Z	16.7N 155.1E	SAT	(11.5/1.5 / HRS)					PCN 5	UMSP									
15	250330Z	16.9N 150.6E	P	5 10 1500 80 25 360					10 25 360		10 1003	-	25 -	-	-	-	-		1
16	250941Z	16.5N 144.3E	SAT	(1H DATA)					PCN 6	UMSP									
17	250941Z	17.1N 144.8E	SAT	(1H DATA)					PCN 6	UMSP									
18	251009Z	16.7N 144.2E	SAT	(1H DATA)					PCN 6	UMSP									
19	251120Z	15.5N 151.2E	SAT	(1H DATA)					N04A-2		(CONF 02)								
20	251150Z	16.6N 148.7E	SAT	(1H DATA)					PCN 5	UMSP									
21	251358Z	16.1N 148.2E	SAT	(1H DATA)					PCN 6	UMSP									
22	252042Z	15.4N 146.9E	SAT	(12.5/2.5 / 100.5/24HRS)					PCN 5	UMSP									
23	252250Z	15.2N 146.8E	SAT	(1H DATA)					PCN 5	UMSP									
24	252250Z	15.2N 146.8E	SAT	(12.0/2.0 / 100.5/24HRS)					PCN 5	UMSP									
25	260012Z	15.7N 146.6E	P	3 3 700 310 30 240					25 25 140		25 1003	310	12 12	CTMC			10		1
26	260240Z	15.3N 145.9E	SAT	(1H DATA)					PCN 3	UMSP									
27	260240Z	15.1N 146.3E	SAT	(1H DATA)					PCN 5	UMSP									
28	260330Z	15.2N 146.8E	P	2 10 700 230 30 120					30 3 20		20 997	306	14 11	CTMC			20		1
29	260511Z	15.4N 146.9E	P	- - 100 - - -					- 30 -		-	-	-	-	-	-	-		1
30	260830Z	15.4N 146.5E	P	2 1 700 180 35 80					60 3 50		50 993	304	15 15	CTMC			3		1
31	260920Z	15.4N 147.4E	SAT	(1H DATA)					PCN 4	UMSP									
32	260925Z	14.8N 147.0E	SAT	(1H DATA)					PCN 4	UMSP									

[illegible]

TYPHOON POLLY  
FIX POSITIONS FOR CYCLONE NO. 19  
1200Z 25 AUG TO 0000Z 02 SEP

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BKG RNG	MAX OBS SFC WIND VEL BKG RNG	OBS MIN SLP	MIN TUGMB MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATION	EYE DIA	POSIT UP HADAR	MSN NMHR
130	312100Z	31.3N 133.8E	LHDK	-	25/12									33.3N 134.2E	
131	312200Z	31.2N 133.6E	LHDK	-	07/12									30.6N 131.0E	
132	312200Z	31.4N 133.7E	LHDK	-	25/12									33.3N 134.2E	
133	312242Z	31.6N 133.7E	SAT	(15.0/5.0 / 01.5/24HRS)			PCN 1 DMSP								
134	312242Z	31.7N 133.8E	SAT	(13.5/4.5 / 01.0/24HRS)			PCN 1 DMSP								
135	312300Z	31.5N 133.8E	LHDK	-	GOOD FIX									33.6N 130.5E	
136	312300Z	31.3N 133.5E	LHDK	-	07/12									30.6N 131.0E	
137	312300Z	31.5N 133.7E	LHDK	-	10/12									33.3N 134.2E	
138	010000Z	31.5N 133.6E	LHDK	-	07/12									30.6N 131.0E	
139	010000Z	31.6N 133.7E	LHDK	-	GOOD FIX, 70 KM DIAM									33.6N 130.5E	
140	010100Z	31.7N 133.7E	LHDK	-	GOOD FIX, 70 KM DIAM									33.6N 130.5E	
141	010100Z	31.6N 133.7E	LHDK	-	0290Z									30.6N 131.0E	
142	010100Z	31.8N 133.5E	LHDK	-	1091Z									33.3N 134.2E	
143	010200Z	31.9N 133.4E	LHDK	-	1092Z									33.3N 134.2E	
144	010200Z	31.8N 133.6E	LHDK	-	3291Z									30.6N 131.0E	
145	010200Z	31.8N 133.6E	LHDK	-	GOOD FIX, 70 KM DIAM									33.6N 130.5E	
146	010230Z	32.2N 133.6E	SAT	(IR DATA)			PCN 1 DMSP								
147	010300Z	31.9N 133.5E	LHDK	-	2191Z									30.6N 131.0E	
148	010300Z	31.9N 133.6E	LHDK	-	GOOD FIX, 70 KM DIAM									33.6N 130.5E	
149	010400Z	32.1N 133.5E	LHDK	-	2191Z									30.6N 131.0E	
150	010400Z	32.0N 133.5E	LHDK	-	GOOD FIX, 70 KM DIAM									33.6N 130.5E	
151	010400Z	32.0N 133.3E	LHDK	-	15/12									33.3N 134.2E	
152	010500Z	32.3N 133.6E	LHDK	-	2097Z									30.6N 131.0E	
153	010500Z	32.3N 133.5E	LHDK	-	GOOD FIX, 70 KM DIAM									33.6N 130.5E	
154	010600Z	32.4N 133.6E	LHDK	-	5594Z									30.6N 131.0E	
155	010600Z	32.3N 133.2E	LHDK	-	05/14									34.3N 132.6E	
156	010700Z	32.6N 133.5E	LHDK	-	GOOD FIX, 80 KM DIAM									33.6N 130.5E	
157	010700Z	32.6N 133.6E	LHDK	-	2191Z									30.6N 131.0E	
158	010700Z	32.7N 133.4E	LHDK	-	17/12									33.3N 134.2E	
159	010700Z	32.6N 133.2E	LHDK	-	17/12									34.3N 132.6E	
160	010800Z	33.0N 133.3E	LHDK	-	05/14									33.3N 134.2E	
161	010800Z	33.0N 133.4E	LHDK	-	GOOD FIX, 80 KM DIAM									33.6N 130.5E	
162	010800Z	33.0N 133.4E	LHDK	-	2191Z									30.6N 131.0E	
163	010900Z	33.3N 133.3E	LHDK	-	20/13									35.5N 133.1E	
164	010900Z	33.2N 133.3E	LHDK	-	17/12									33.3N 134.2E	
165	010900Z	33.2N 133.4E	LHDK	-	GOOD FIX, 60 KM DIAM									33.6N 130.5E	
166	011000Z	33.6N 133.0E	LHDK	-	GOOD FIX, 30 KM DIAM									33.3N 134.2E	
167	011000Z	33.4N 133.2E	LHDK	-	27/12									34.3N 132.6E	
168	011000Z	33.4N 133.1E	LHDK	-	05/13									35.5N 133.1E	
169	011020Z	33.4N 133.3E	LHDK	-	20/13									33.6N 130.5E	
170	011100Z	33.8N 133.1E	LHDK	-	20/13									35.5N 133.1E	
171	011124Z	33.7N 132.9E	SAT	(IR DATA)			PCN 5 DMSP								
172	011124Z	33.8N 133.3E	SAT	(IR DATA)			PCN 5 DMSP								
173	011125Z	33.7N 133.1E	LHDK	-	POOR FIX									33.6N 130.5E	
174	011200Z	34.3N 133.2E	LHDK	-	2020Z									35.5N 133.1E	
175	011200Z	34.2N 133.0E	LHDK	-	POOR FIX									33.6N 130.5E	
176	011300Z	34.5N 132.8E	LHDK	-	2031Z									35.5N 133.1E	
177	011300Z	34.5N 132.8E	LHDK	-	05/12									34.3N 132.6E	
178	011300Z	34.6N 132.8E	LHDK	-	POOR FIX									33.6N 130.5E	
179	011305Z	34.2N 132.7E	SAT	(IR DATA)			PCN 5 DMSP								
180	011345Z	34.7N 132.6E	LHDK	-	POOR FIX, 20 KM DIAM									34.7N 134.9E	
181	011400Z	34.7N 132.6E	LHDK	-	2034Z									35.5N 133.1E	
182	011400Z	34.7N 132.6E	LHDK	-	POOR FIX									33.6N 130.5E	
183	011400Z	35.0N 132.6E	LHDK	-	05/11									34.3N 132.6E	
184	011445Z	34.9N 132.5E	LHDK	-	POOR FIX, 15 KM DIAM									34.7N 134.9E	
185	011500Z	35.3N 132.6E	LHDK	-	2031Z									35.5N 133.1E	
186	011500Z	35.5N 132.6E	LHDK	-	2103Z									34.3N 132.6E	
187	011500Z	35.2N 132.5E	LHDK	-	POOR FIX									33.6N 130.5E	
188	011511Z	35.2N 132.3E	SAT	(IR DATA)			PCN 5 DMSP								
189	011545Z	35.2N 132.4E	LHDK	-	POOR FIX, 15 KM DIAM									34.7N 134.9E	
190	011600Z	35.7N 132.5E	LHDK	-	2015Z									35.5N 133.1E	
191	011600Z	36.0N 132.4E	LHDK	-	2103Z									34.3N 132.6E	
192	011600Z	35.4N 132.3E	LHDK	-	POOR FIX									33.6N 130.5E	
193	011645Z	35.6N 132.2E	LHDK	-	POOR FIX, 15 KM DIAM									34.7N 134.9E	
194	011700Z	35.9N 132.3E	LHDK	-	2017Z									35.5N 133.1E	
195	011700Z	36.2N 132.2E	LHDK	-	POOR FIX									33.6N 130.5E	
196	012000Z	36.3N 131.6E	LHDK	-										35.5N 133.1E	
197	012242Z	37.5N 132.4E	SAT	(13.0/4.0 / 02.0/24HRS)			PCN 3 DMSP								
198	012242Z	37.6N 132.5E	SAT	(12.0/4.0 / 01.5/24HRS)			PCN 3 DMSP								
199	020000Z	37.6N 132.7E	SAT	(IR DATA)			PCN 3 DMSP								
200	020010Z	37.1N 132.0E	SAT	(13.0/4.5 / 01.5/24HRS)			NOAA-2						(CONF 02)		
201	021247Z	41.0N 132.7E	SAT	(IR DATA)			PCN 5 DMSP								

TROPICAL DEPRESSION 20  
FIX POSITIONS FOR CYCLONE NO. 20  
0000Z 27 AUG TO 0600Z 28 AUG

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BKG RNG	MAX OBS SFC WIND VEL BKG RNG	OBS MIN SLP	MIN TUGMB MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATION	EYE DIA	POSIT UP HADAR	MSN NMHR
1	252224Z	22.7N 127.4E	SAT	(11.0/1.0 / / HRS)			PCN 5 DMSP								
2	260240Z	23.2N 126.5E	SAT	(IR DATA)			PCN 5 DMSP								
3	261107Z	24.6N 128.2E	SAT	(IR DATA)			PCN 6 DMSP								
4	270013Z	24.7N 131.3E	SAT	(12.0/2.0 / 01.0/24HRS)			PCN 3 DMSP								
5	270222Z	24.9N 131.6E	SAT	(IR DATA)			PCN 3 DMSP								
6	270222Z	25.2N 131.5E	SAT	(12.0/2.0 / / HRS)			PCN 4 DMSP								
7	271051Z	25.0N 131.6E	SAT	(IR DATA)			PCN 5 DMSP								
8	271052Z	25.0N 131.8E	SAT	(IR DATA)			PCN 6 DMSP								
9	271255Z	26.0N 131.0E	SAT	(IR DATA)			PCN 3 DMSP								
10	271255Z	26.2N 130.9E	SAT	(IR DATA)			PCN 6 DMSP								
11	271503Z	26.2N 130.8E	SAT	(IR DATA)			PCN 5 DMSP								
12	272153Z	26.5N 129.7E	SAT	(11.5/2.0 / 00.5/24HRS)			PCN 3 DMSP								
13	272355Z	27.0N 129.5E	SAT	(IR DATA)			PCN 3 DMSP								
14	272455Z	27.2N 129.7E	SAT	(11.0/2.0 / 01.0/24HRS)			PCN 5 DMSP								
15	280203Z	27.4N 128.9E	SAT	(IR DATA)			PCN 3 DMSP								
16	280430Z	27.1N 128.7E	P	2 8 1500	80 20 90	25 20 110	30 994			25 24					1
17	281237Z	27.8N 128.9E	SAT	(IR DATA)			PCN 3 DMSP								

TROPICAL STORM ROSE  
FIX POSITIONS FOR CYCLONE NO. 21  
0600Z 28 AUG TO 0600Z 31 AUG

FIX NO.	TIME	POS	FIX ACQTY	FIX CAT	NAV-MET	LVL	DIR	VEL	WIND	MAX OBS SFC WIND	MAX OBS VEL	MAX OBS BRG	MAX OBS RNG	OBS MIN SLP	MIN 700MB	FLT LVL	FLY TI/TO	EYE FORM	ORIENT- TION	EYE DIA	MUSIT OF HADAR	MSN
1	272153Z	22.0N 122.5E	SAT	(11.0/1.0 /	/	MMS)				PCN 5 DMSP												
2	272355Z	23.0N 122.5E	SAT	(1K DATA	)					PCN 5 DMSP												
3	272355Z	23.0N 122.1E	SAT	(12.0/2.0 /	/	MMS)				PCN 5 DMSP												
4	280100Z	22.0N 123.9E	LHUM	-	0/112																24.0N 125.3E	
5	280125Z	23.0N 123.1E	SAT	(12.0/2.0 /	01.0/24HRS)					NOAA-2				(CONF 01)							24.3N 124.2E	
6	280300Z	22.7N 124.0E	LHUM	-	0/112																24.0N 125.3E	
7	280300Z	23.0N 124.1E	LHUM	-	0/112																24.0N 125.3E	
8	280400Z	22.9N 124.4E	LHUM	-	0/112																24.0N 125.3E	
9	280400Z	22.7N 124.2E	LHUM	-	0/112																24.0N 125.3E	
10	280500Z	22.8N 124.8E	LHUM	-	0/112																24.0N 125.3E	
11	280625Z	23.0N 124.9E	P	2	2	700	110	30	350	35	3	3.0	40	986	298	13	11	ELIP	SW-NE	15X10	24.0N 125.3E	1
12	280800Z	22.8N 125.5E	LHUM	-	0/113																24.0N 125.3E	
13	280925Z	23.1N 125.7E	P	2	3	700	290	50	200	40	40	50	25	987	298	16	12	ELIP	SW-NE	15X10	24.0N 125.3E	1
14	281000Z	23.2N 125.9E	LHUM	-	0/113																24.0N 125.3E	
15	281000Z	23.1N 125.9E	LHUM	-	0/110																24.3N 124.2E	
16	281036Z	23.1N 125.0E	SAT	(1K DATA	)					PCN 6 DMSP												
17	281036Z	23.3N 125.8E	SAT	(1K DATA	)					PCN 6 DMSP												
18	281100Z	23.3N 125.9E	LHUM	-	0/110																24.3N 124.2E	
19	281100Z	23.2N 126.2E	LHUM	-	0/112																24.0N 125.3E	
20	281200Z	23.4N 126.3E	LHUM	-	0/112																24.0N 125.3E	
21	281200Z	23.3N 126.2E	LHUM	-	0/110																24.3N 124.2E	
22	281213Z	24.0N 126.0E	SAT	(1K DATA	)					NOAA-2				(CONF 02)								
23	281237Z	23.2N 126.5E	SAT	(1K DATA	)					PCN 3 DMSP												
24	281237Z	23.1N 126.7E	SAT	(1K DATA	)					PCN 3 DMSP												
25	281300Z	23.5N 126.4E	LHUM	-	0/111																24.3N 124.2E	
26	281300Z	23.4N 126.5E	LHUM	-	0/111																24.0N 125.3E	
27	281400Z	23.6N 126.5E	LHUM	-	0/110																24.3N 124.2E	
28	281400Z	23.4N 126.8E	LHUM	-	0/111																24.0N 125.3E	
29	281500Z	23.9N 126.8E	P	5	30	700	190	45	120	30	-	-	-	987	298	14	13	CTHC		30	24.0N 125.3E	2
30	281500Z	23.7N 127.0E	LHUM	-	0/112																24.0N 125.3E	
31	281600Z	23.7N 127.1E	LHUM	-	0/112																24.0N 125.3E	
32	281700Z	23.7N 127.1E	LHUM	-	0/112																24.0N 125.3E	
33	281800Z	23.9N 127.3E	LHUM	-	0/112																24.0N 125.3E	
34	281900Z	23.9N 127.4E	LHUM	-	0/113																24.0N 125.3E	
35	281900Z	24.0N 127.6E	LHUM	-	0/111																24.0N 127.8E	
36	282130Z	24.5N 127.7E	P	10	10	700	270	30	180	40	40	100	30	989	298	14	13	CTHC		30	24.0N 127.8E	2
37	282138Z	24.3N 127.4E	SAT	(1K DATA	)					PCN 3 DMSP												
38	282337Z	24.3N 127.5E	SAT	(11.0/1.0 /	5	26HRS)				PCN 3 DMSP												
39	282337Z	24.9N 128.1E	SAT	(11.5/2.0 /	00.5/24HRS)					PCN 5 DMSP												
40	290000Z	24.5N 128.2E	LHUM	-	0/111																26.1N 127.8E	
41	290145Z	24.9N 128.2E	LHUM	-	FAIR FIX, 20 DEG SPIRAL OVERLAY																26.4N 127.8E	
42	290200Z	24.8N 128.3E	LHUM	-	0/111																26.1N 127.8E	
43	290210Z	25.0N 128.2E	LHUM	-	FAIR FIX, 10 DEG SPIRAL OVERLAY																26.4N 127.8E	
44	290310Z	25.4N 128.2E	LHUM	-	FAIR FIX, 10 DEG SPIRAL OVERLAY																26.4N 127.8E	
45	290340Z	25.0N 128.4E	LHUM	-	FAIR FIX, 10 DEG SPIRAL OVERLAY																26.4N 127.8E	
46	290400Z	25.0N 128.2E	LHUM	-	FAIR FIX, 10 DEG SPIRAL OVERLAY																26.4N 127.8E	
47	290442Z	25.5N 128.4E	LHUM	-	FAIR FIX, 10 DEG SPIRAL OVERLAY																26.4N 127.8E	
48	290500Z	25.2N 128.6E	LHUM	-	0/111																26.1N 127.8E	
49	290510Z	25.8N 128.3E	LHUM	-	FAIR FIX, 10 DEG SPIRAL OVERLAY																26.4N 127.8E	
50	290540Z	25.2N 128.5E	P	2	5	700	230	45	130	30	50	130	30	986	299	16	14	-	-	-	26.4N 127.8E	3
51	290542Z	25.8N 128.3E	LHUM	-	FAIR FIX, 10 DEG SPIRAL OVERLAY																26.4N 127.8E	
52	290545Z	25.3N 128.9E	LHUM	-	POOR FIX																26.4N 127.8E	
53	290700Z	25.5N 128.7E	LHUM	-	0/111																26.1N 127.8E	
54	290710Z	25.5N 128.7E	LHUM	-	FAIR FIX																26.4N 127.8E	
55	290745Z	25.8N 128.8E	LHUM	-	FAIR FIX, 15 DEG SPIRAL OVERLAY																26.4N 127.8E	
56	290800Z	25.7N 128.8E	LHUM	-	0/111																26.1N 127.8E	
57	290810Z	25.7N 128.3E	LHUM	-	FAIR FIX, 15 DEG SPIRAL OVERLAY																26.4N 127.8E	
58	290840Z	25.7N 128.9E	LHUM	-	POOR FIX																26.2N 127.8E	
59	290844Z	25.8N 128.9E	LHUM	-	FAIR FIX, 15 DEG SPIRAL OVERLAY																26.4N 127.8E	
60	290900Z	25.7N 128.8E	LHUM	-	0/111																26.1N 127.8E	
61	290900Z	25.7N 129.0E	LHUM	-	POOR FIX																26.2N 127.8E	
62	290910Z	25.8N 129.0E	LHUM	-	FAIR FIX, 15 DEG SPIRAL OVERLAY																26.4N 127.8E	
63	290911Z	25.6N 129.8E	P	2	5	700	240	50	120	25	50	1.0	25	985	298	16	16	-	-	-	26.4N 127.8E	3
64	290940Z	25.8N 129.1E	LHUM	-	FAIR FIX, HVT ATTN. 15 DEG SPIRAL OVERLAY																26.4N 127.8E	
65	291000Z	25.9N 128.8E	LHUM	-	0/111																26.1N 127.8E	
66	291000Z	26.0N 128.9E	LHUM	-	0/111																26.4N 127.8E	
67	291000Z	25.8N 129.0E	LHUM	-	GOOD FIX, 15 DEG SPIRAL OVERLAY																26.2N 127.8E	
68	291010Z	25.9N 129.0E	LHUM	-	POOR FIX																26.4N 127.8E	
69	291021Z	26.0N 128.8E	SAT	(1K DATA	)					PCN 4 DMSP												
70	291021Z	26.4N 128.8E	SAT	(1K DATA	)					PCN 4 DMSP												
71	291040Z	26.0N 128.8E	LHUM	-	FAIR FIX, 15 DEG SPIRAL OVERLAY																26.4N 127.8E	
72	291100Z	26.2N 129.0E	LHUM	-	0/111																26.4N 129.5E	
73	291100Z	26.1N 128.9E	LHUM	-	0/111																26.1N 127.8E	
74	291113Z	25.8N 128.8E	SAT	(1K DATA	)					NOAA-2				(CONF 02)								
75	291140Z	26.3N 129.1E	LHUM	-	FAIR FIX, 15 DEG SPIRAL OVERLAY																26.4N 127.8E	
76	291200Z	26.3N 128.9E	LHUM	-	0/111																26.1N 127.8E	
77	291200Z	26.3N 128.9E	LHUM	-	05/6/																26.4N 129.5E	
78	291200Z	26.0N 129.1E	LHUM	-	FAIR FIX, 15 DEG SPIRAL OVERLAY																26.2N 127.8E	
79	291210Z	26.1N 129.1E	LHUM	-	POOR FIX																26.4N 127.8E	
80	291218Z	26.3N 128.9E	SAT	(1K DATA	)					PCN 3 DMSP												
81	291218Z	26.4N 129.1E	SAT	(1K DATA	)					PCN 5 DMSP												
82	291245Z	26.2N 129.1E																				

TROPICAL STORM ROSE  
FIX POSITIONS FOR CYCLONE NO. 21  
0600Z 28 AUG TO 0600Z 31 AUG

FIX NO.	TIME	PUSIT	FIX ACCKY CAT NAV-MET	FIX LVL DIR VEL BKG RNG	MAX OBS FLT LVL WIND SFC WIND	HAA OBS SFC WIND	OBS MIN /UOMB LVL	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	PUSIT OF MAUAR	MSN NMBR
101	291700Z	26.9N 128.7E	LH0H	- 5////								26.1N 127.8E	
102	291705Z	26.8N 128.8E	LH0H	- FAIR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
103	291730Z	26.8N 128.7E	LH0H	- POOR FIX								26.2N 127.7E	
104	291737Z	26.8N 128.8E	LH0H	- FAIR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
105	291800Z	26.9N 128.8E	LH0H	- 55////								28.0N 129.5E	
106	291805Z	26.8N 128.8E	LH0H	- FAIR FIX, 20 DEG SPIRAL OVERLAY								26.4N 127.8E	
107	291844Z	26.9N 128.8E	LH0H	- FAIR FIX, 20 DEG SPIRAL OVERLAY								26.4N 127.8E	
108	291900Z	27.0N 128.8E	LH0H	- 55////								28.4N 129.5E	
109	291900Z	27.0N 128.5E	LH0H	- 55////								26.1N 127.8E	
110	292000Z	27.1N 128.6E	LH0H	- 55////								26.1N 127.8E	
111	292110Z	26.9N 128.6E	LH0H	- FAIR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
112	292122Z	27.1N 128.6E	SAT	(1H DATA ) PCN 4 DMSP									
113	292139Z	27.0N 128.6E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
114	292141Z	27.0N 128.8E	LH0H	- FAIR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
115	292210Z	27.0N 128.6E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
116	292238Z	26.9N 128.6E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
117	292308Z	27.0N 128.8E	LH0H	- POOR FIX, 20 DEG SPIRAL OVERLAY								26.4N 127.8E	
118	292318Z	27.2N 128.5E	SAT	(12.0/2.0 /D1.0/24HMS) PCN 5 DMSP									
119	292318Z	27.1N 128.5E	SAT	(12.0/2.0 /D0.5/24HMS) PCN 5 DMSP									
120	292340Z	27.0N 128.9E	LH0H	- POOR FIX, 20 DEG SPIRAL OVERLAY								26.4N 127.8E	
121	300000Z	27.3N 128.4E	LH0H	- 57////								26.1N 127.8E	
122	300010Z	27.2N 128.5E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
123	300046Z	27.3N 128.6E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
124	300100Z	27.4N 128.2E	LH0H	- 65////								28.4N 129.5E	
125	300112Z	27.2N 128.5E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
126	300140Z	27.3N 128.6E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
127	300200Z	27.3N 128.9E	LH0H	- 67////								26.1N 127.8E	
128	300200Z	27.4N 128.5E	LH0H	- 65////								28.4N 129.5E	
129	300213Z	27.3N 128.9E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
130	300243Z	27.4N 128.8E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY								26.4N 127.8E	
131	300300Z	27.4N 128.4E	LH0H	- 65////								28.4N 129.5E	
132	300300Z	27.3N 128.9E	LH0H	- 57////								26.1N 127.8E	
133	300307Z	27.4N 128.8E	LH0H	- POOR FIX, EXTRAPOLATED, NO WELL DEFINED SPIRAL BANDS								26.4N 127.8E	
134	300308Z	27.1N 128.9E	SAT	(1H DATA ) PCN 5 DMSP									
135	300347Z	27.5N 128.9E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY, WALL CLOUD NOT VISIBLE								26.4N 127.8E	
136	300400Z	27.5N 128.8E	LH0H	- 67////								26.1N 127.8E	
137	300400Z	27.3N 128.8E	LH0H	- 65////								28.4N 129.5E	
138	300405Z	27.5N 128.9E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY, NO WALL CLOUD								26.4N 127.8E	
139	300426Z	27.2N 128.8E	P 1	2 700 310 52 220 45 40 40 20 986 299 15 12 CTNC 60									
140	300440Z	27.5N 128.9E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY, NO WALL CLOUD								26.4N 127.8E	
141	300500Z	27.5N 128.8E	LH0H	- 67////								26.1N 127.8E	
142	300515Z	27.5N 128.9E	LH0H	- POOR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
143	300540Z	27.5N 129.0E	LH0H	- POOR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
144	300610Z	27.5N 129.0E	LH0H	- POOR FIX, 15 DEG SPIRAL OVERLAY, NO WELL DEFINED SPIRAL BANDS								26.4N 127.8E	
145	300637Z	27.5N 129.0E	LH0H	-								26.4N 127.8E	
146	300700Z	27.1N 129.1E	LH0H	- 67////								26.1N 127.8E	
147	300700Z	27.1N 129.0E	LH0H	- 659///								28.4N 129.5E	
148	300710Z	27.2N 129.1E	LH0H	- FAIR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
149	300740Z	27.2N 129.3E	LH0H	- FAIR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
150	300805Z	27.2N 129.3E	LH0H	- FAIR FIX								26.4N 127.8E	
151	300832Z	27.1N 129.4E	LH0H	- FAIR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
152	300900Z	27.0N 129.3E	LH0H	- 31912								28.4N 129.5E	
153	300900Z	26.9N 129.4E	LH0H	- 67////								26.1N 127.8E	
154	300908Z	27.1N 129.5E	LH0H	- 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
155	300946Z	27.0N 129.5E	LH0H	- POOR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
156	301010Z	27.0N 129.2E	LH0H	- POOR FIX, 15 DEG SPIRAL OVERLAY								26.4N 127.8E	
157	301040Z	27.1N 129.3E	LH0H	- BY XMAP, NO SPIRAL BAND								26.4N 127.8E	
158	301200Z	26.6N 129.8E	SAT	(1H DATA ) PCN 3 DMSP									
159	301240Z	26.7N 129.3E	LH0H	- POOR FIX, 10 DEG SPIRAL OVERLAY, NO WALL CLOUD								26.4N 127.8E	
160	301300Z	26.5N 129.9E	LH0H	- 677/2								28.4N 129.5E	
161	301400Z	26.5N 130.3E	LH0H	- 677/2								26.1N 127.8E	
162	301549Z	26.7N 130.3E	SAT	(1H DATA ) PCN 3 DMSP									
163	301600Z	26.5N 130.3E	LH0H	- 657/2								28.4N 129.5E	
164	301600Z	26.5N 130.3E	LH0H	- 677/2								26.1N 127.8E	
165	301650Z	26.1N 130.0E	P 1	2 100 290 40 260 40 - - - 990 302 17 13 - - -									
166	301700Z	26.5N 130.4E	LH0H	- 657/2								28.4N 129.5E	
167	302228Z	25.8N 131.5E	P 2	2 700 290 50 220 50 30 110 30 990 303 17 13 - - -									
168	302300Z	25.5N 131.6E	SAT	(12.5/2.5 /50.5/24HMS) PCN 3 DMSP									
169	302300Z	25.4N 131.5E	SAT	(12.5/2.5 /D0.5/24HMS) PCN 3 DMSP									
170	310249Z	25.4N 133.0E	SAT	(1H DATA ) PCN 3 DMSP									
171	311142Z	25.5N 137.1E	SAT	(1H DATA ) PCN 5 DMSP									
172	31130Z	25.6N 137.4E	SAT	(1H DATA ) PCN 3 DMSP									
173	312242Z	27.7N 139.6E	SAT	(1H DATA ) PCN 3 DMSP									
174	010230Z	29.5N 139.8E	SAT	(1H DATA ) PCN 3 DMSP									
175	011124Z	31.3N 140.5E	SAT	(1H DATA ) PCN 3 DMSP									
176	011911Z	32.7N 140.2E	SAT	(1H DATA ) PCN 3 DMSP									

FIX NO.	TIME	POSIT	FIX CAT	ACQV-MET	FIX LVL	DIR	VEL	BRG	RNG	MAX OBS SFC WIND VLG	MAX OBS WIND BRG	OBS MIN SLP	MIN 700MB HGT	FLT EVL T1/T0	EYE FORM	ORIENT- IATION	EYE DIA	PUSIT OF MAUAD	MSG NMBR
1	040011Z	23.9N 130.5E	SAT	(12.0/2.0 /01.0/24HRS)						NOAA-2		(CONF 01)							
2	041100Z	25.8N 131.9E	SAT	(1K DATA )						NOAA-2		(CONF 01)							
3	050107Z	26.0N 131.0E	SAT	(13.0/3.0 /01.0/24HRS)						NOAA-2		(CONF 01)							
4	051157Z	26.6N 131.1E	SAT	(1R DATA )						NOAA-2		(CONF 01)							
5	060005Z	26.2N 129.2E	SAT	(13.5/3.5 /00.5/24HRS)						NOAA-2		(CONF 01)							
6	061055Z	27.7N 128.8E	SAT	(1R DATA )						NOAA-2		(CONF 01)							
7	070059Z	28.2N 127.3E	SAT	(13.0/3.0 /00.5/24HRS)						NOAA-2		(CONF 01)							
8	071152Z	28.9N 128.0E	SAT	(1R DATA )						NOAA-2		(CONF 02)							
9	081052Z	32.3N 130.5E	SAT	(1R DATA )						NOAA-2		(CONF 02)							
10	021247Z	23.4N 128.1E	SAT	(1R DATA )						PCN 5 DMSP									
11	021247Z	23.2N 127.7E	SAT	(1R DATA )						PCN 5 DMSP									
12	022344Z	24.0N 128.6E	SAT	(11.5/1.5 / / HRS)						PCN 5 DMSP									
13	022347Z	23.6N 129.0E	SAT	(11.5/1.5 / / HRS)						PCN 5 DMSP									
14	030335Z	24.3N 129.0E	SAT	(1R DATA )						PCN 5 DMSP									
15	031229Z	24.0N 130.0E	SAT	(1R DATA )						PCN 5 DMSP									
16	031229Z	24.4N 129.4E	SAT	(1R DATA )						PCN 5 DMSP									
17	032326Z	24.2N 130.8E	SAT	(12.0/2.0 /00.5/24HRS)						PCN 5 DMSP									
18	032329Z	24.4N 130.7E	SAT	(12.0/2.0 /00.5/24HRS)						PCN 5 DMSP									
19	040316Z	24.9N 130.8E	SAT	(1R DATA )						PCN 5 DMSP									
20	041210Z	24.7N 131.4E	SAT	(1R DATA )						PCN 3 DMSP									
21	041210Z	25.3N 131.5E	SAT	(1R DATA )						PCN 6 DMSP									
22	041555Z	25.4N 131.3E	P	5 10 700 - 50 50 15 -						491		301	12	11	CTRL		25		1
23	041557Z	25.4N 131.7E	SAT	(1R DATA )						PCN 3 DMSP									
24	041800Z	25.7N 131.6E	SAT	(1R DATA )						PCN 8 DMSP									
25	042100Z	25.7N 131.1E	P	5 10 700 270 50 170 40 3 190						40		-	12	11	CTMC		20		1
26	042310Z	25.5N 131.3E	SAT	(13.0/3.0 /01.0/24HRS)						PCN 3 DMSP									
27	042310Z	26.0N 131.5E	SAT	(12.5/2.5 /00.5/24HRS)						PCN 3 DMSP									
28	050200Z	26.1N 131.2E	LKND	- 05/12														28.4N 129.5E	
29	050258Z	25.7N 131.0E	SAT	(1R DATA )						PCN 3 DMSP									
30	050300Z	26.1N 131.6E	LKND	- 05/13														28.4N 129.5E	
31	050400Z	26.2N 131.4E	LKND	- 05/13														28.4N 129.5E	
32	050700Z	26.3N 131.3E	LKND	- 20/12														28.4N 129.5E	
33	050800Z	26.4N 131.2E	LKND	- 21/12														28.4N 129.5E	
34	050830Z	26.7N 131.2E	P	4 7 700 170 60 140 60 75 140 50 480						293		15	11	ETIP	N-S	40X25		3	
35	050900Z	26.3N 131.2E	LKND	- 21/12														28.4N 129.5E	
36	051000Z	26.5N 131.2E	LKND	- 21/12														28.4N 129.5E	
37	051100Z	26.4N 131.0E	LKND	- 21/12														28.4N 129.5E	
38	051152Z	26.4N 130.6E	SAT	(1R DATA )						PCN 1 DMSP									
39	051152Z	26.7N 130.5E	SAT	(1R DATA )						PCN 3 DMSP									
40	051200Z	26.3N 131.0E	LKND	- 6/11														26.4N 127.8E	
41	051300Z	26.0N 130.9E	LKND	- 21/12														28.4N 129.5E	
42	051300Z	26.5N 131.0E	LKND	- 6/11														26.4N 127.8E	
43	051400Z	26.5N 130.9E	LKND	- 21/12														28.4N 129.5E	
44	051400Z	26.5N 131.0E	LKND	- 6/11														26.4N 127.8E	
45	051430Z	26.5N 130.6E	P	1 2 700 270 60 160 50 - - -						479		291	16	12	ETIP	N-S	40X20	3	
46	051500Z	26.6N 130.8E	LKND	- 22/12														28.4N 129.5E	
47	051500Z	26.7N 130.9E	LKND	- 6/11														26.4N 127.8E	
48	051539Z	26.7N 130.7E	SAT	(1R DATA )						PCN 1 DMSP									
49	051600Z	26.7N 130.6E	LKND	- 21/13														28.4N 129.5E	
50	051600Z	26.7N 130.6E	LKND	- 5/11														26.4N 127.8E	
51	051633Z	26.5N 130.5E	LKND	- GOOD FIX, 10 DEG SPIRAL OVERLAY														26.4N 127.8E	
52	051700Z	26.7N 130.5E	LKND	- 10/12														28.4N 129.5E	
53	051700Z	26.9N 130.6E	LKND	- 6/11														26.4N 127.8E	
54	051800Z	26.7N 130.4E	LKND	- 21/13														28.4N 129.5E	
55	051800Z	26.9N 130.5E	LKND	- 6/11														26.4N 127.8E	
56	051900Z	26.7N 130.3E	LKND	- 21/13														28.4N 129.5E	
57	051900Z	27.1N 130.2E	LKND	- 6/11														26.4N 127.8E	
58	051900Z	26.9N 130.3E	LKND	- GOOD FIX														26.4N 127.8E	
59	051910Z	26.4N 130.2E	LKND	- 38 PERCENT WALL CLOUD														26.4N 127.8E	
60	052000Z	26.8N 130.2E	LKND	- 21/13														28.4N 129.5E	
61	052000Z	27.1N 130.2E	LKND	- 6/11														26.4N 127.8E	
62	052005Z	26.9N 130.2E	LKND	- FAIR FIX, 20 DEG SPIRAL OVERLAY, NO VISIBLE WALL CLOUD														26.4N 127.8E	
63	052040Z	26.9N 130.0E	LKND	- 20 DEG SPIRAL OVERLAY, 20 PERCENT WALL CLOUD														28.4N 129.5E	
64	052100Z	26.8N 130.1E	LKND	- 21/12														28.4N 129.5E	
65	052100Z	27.1N 130.2E	LKND	- 6/11														26.4N 127.8E	
66	052105Z	26.8N 130.2E	LKND	- 20 DEG SPIRAL OVERLAY, 15 PERCENT WALL CLOUD														26.4N 127.8E	
67	052200Z	26.8N 130.0E	LKND	- 21/12														28.4N 129.5E	
68	052200Z	26.9N 129.9E	LKND	- 6/11														26.4N 127.8E	
69	052205Z	26.7N 129.8E	LKND	- FAIR FIX, ELLIPTICAL EYE, 20 DEG SPIRAL OVERLAY, 60 PERCENT WALL CLOUD														26.4N 127.8E	
70	052240Z	26.8N 129.8E	LKND	- FAIR FIX, ELLIPTICAL EYE, 70 DEG SPIRAL OVERLAY, 60 PERCENT WALL CLOUD														26.4N 127.8E	
71	052252Z	26.9N 129.7E	SAT	(13.5/3.5 /00.5/24HRS)						PCN 1 DMSP									
72	052252Z	26.8N 129.7E	SAT	(13.0/3.0 /00.5/24HRS)						PCN 3 DMSP									
73	052300Z	26.8N 129.9E	LKND	- 22/12														28.4N 129.5E	
74	052300Z	26.8N 129.8E	LKND	- 22/13														26.4N 127.8E	
75	052310Z	26.7N 129.8E	LKND	- GOOD FIX, ELLIPTICAL EYE, 20 DEG SPIRAL OVERLAY, 70 PERCENT WALL CLOUD														26.4N 127.8E	
76	052340Z	26.8N 129.8E	LKND	- GOOD FIX, EYE 29 NM DIAM, 20 DEG SPIRAL OVERLAY, 60 PERCENT WALL CLOUD														26.4N 127.8E	
77	060000Z	26.9N 129.7E	LKND	- 22/13														28.4N 129.5E	
78	060000Z	26.8N 129.7E	LKND	- 32/42														26.4N 127.8E	
79	060010Z	26.7N 129.7E	LKND	- GOOD FIX, CIRCULAR EYE 28 NM DIAM, 60 PERCENT WALL CLOUD														28.4N 129.5E	
80	060030Z	26.7N 129.6E	LKND	-														26.4N 127.8E	
81	060040Z	26.8N 129.7E	LKND	- CIRCULAR EYE 30 NM DIAM, 20 DEG SPIRAL OVERLAY, 50 PERCENT WALL CLOUD														28.4N 129.5E	
82	060100Z	26.9N 129.5E	LKND	- 22/13														26.4N 127.8E	
83	060100Z	26.9N 129.5E	LKND	- 32/47														28.4N 129.5E	
84	060110Z	26.8N 129.6E	LKND	- CIRCULAR EYE 29 NM DIAM, 20 DEG SPIRAL OVERLAY, 40 PERCENT WALL CLOUD														26.4N 127.8E	
85	060130Z	27.1N 129.4E	LKND	-														28.4N 129.5E	
86	060140Z	26.7N 129.6E	LKND	- CIRCULAR EYE 31 NM DIAM, 20 DEG SPIRAL OVERLAY, 50 PERCENT WALL CLOUD														26.4N 127.8E	
87	060200Z	27.0N 129.4E	LKND	- 21/13														28.4N 129.5E	
88	060200Z	27.0N 129.4E	LKND	- 52/47														26.4N 127.8E	
89	060208Z	27.0N 129.5E	LKND	- GOOD FIX, CIRCULAR EYE 35 NM DIAM, 60 PERCENT WALL CLOUD														28.4N 129.5E	
90	060230Z	27.3N 129.2E	LKND	- GOOD FIX														26.4N 127.8E	
91	060239Z	26.9N 129.4E	SAT	(1R DATA )						PCN 1 DMSP									
92	060242Z	27.1N 129.5E	LKND	- FAIR FIX, CIRCULAR EYE 35 NM DIAM, 50 PERCENT WALL CLOUD															

TYPHOON SHIRLEY

CONDITIONS FOR CYCLON

04 SEP TO 00002

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TYPHOON SHIRLEY  
FIX POSITIONS FOR CYCLONE NO. 22  
0000Z 04 SEP TO 0000Z 09 SEP

[illegible]



TROPICAL STORM TRIX  
FIX POSITIONS FOR CYCLONE NO. 23  
1200Z 05 SEP TO 1200Z 06 SEP

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN 700MB MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATLON	EYE DIA	POSIT OF MAUAR	MSN NMHM
1	050052Z	20.1N 115.9E	SAT	(13.0/3.0 /		/ HRS)	PCN 3 DMSP								
2	050900Z	20.6N 115.1E	LHNR	-										22.3N 114.2E	-
3	051200Z	20.6N 114.7E	LHNR	-										22.3N 114.2E	-
4	051334Z	20.0N 115.5E	SAT	(1K DATA			PCN 5 DMSP								
5	051422Z	20.0N 115.0E	SAT	(1K DATA			NOAA-2								
6	051500Z	20.7N 114.1E	LHNR	-										22.3N 114.2E	-
7	051800Z	20.7N 113.5E	LHNR	-										22.3N 114.2E	-
8	052100Z	20.8N 113.3E	LHNR	-										22.3N 114.2E	-
9	060000Z	20.9N 113.1E	LHNR	-										22.3N 114.2E	-
10	060034Z	20.5N 112.8E	SAT	(13.0/3.0-/S		/24HRS)	PCN 5 DMSP								
11	060202Z	21.4N 112.4E	SAT	(13.0/3.0-/D1.0/24HRS)			NOAA-2								
12	060310Z	21.4N 112.4E	LHNR	-										22.3N 114.2E	-
13	060600Z	21.7N 112.1E	LHNR	-										22.3N 114.2E	-
14	060900Z	21.9N 111.4E	LHNR	-										22.3N 114.2E	-
15	061315Z	22.3N 109.9E	SAT	(1K DATA			PCN 5 DMSP							22.3N 114.2E	-
16	061315Z	22.5N 110.8E	SAT	(1K DATA			PCN 5 DMSP							22.3N 114.2E	-
17	070015Z	22.6N 107.9E	SAT	(1K DATA			PCN 5 DMSP								

TYPHOON VIRGINIA  
FIX POSITIONS FOR CYCLONE NO. 24  
1200Z 12 SEP TO 0000Z 16 SEP

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN 700MB MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATLON	EYE DIA	POSIT OF MAUAR	MSN NMHM
1	092139Z	22.0N 153.4E	SAT	(11.0/1.0 /		/ HRS)	PCN 6 DMSP								
2	101021Z	23.0N 152.8E	SAT	(1K DATA			PCN 6 DMSP								
3	102302Z	22.5N 150.8E	SAT	(11.0/1.0 /S		/24HRS)	PCN 5 DMSP								
4	111144Z	27.2N 149.8E	SAT	(1K DATA			PCN 5 DMSP								
5	112243Z	28.9N 149.1E	SAT	(12.0/2.0 /D1.0/24HRS)			PCN 5 DMSP								
6	121126Z	30.1N 150.6E	SAT	(1K DATA			PCN 3 DMSP								
7	121126Z	30.5N 150.7E	SAT	(1K DATA			PCN 5 DMSP								
8	121510Z	31.1N 151.2E	SAT	(1K DATA			PCN 5 DMSP								
9	121845Z	31.0N 151.0E	SAT	(1K DATA			NOAA-2								
10	122153Z	32.0N 152.2E	P	10 2	700 270	80 240	25 70 190	20 980	293	14 11	CTMC		40		1
11	122226Z	32.3N 152.3E	SAT	(14.0/4.0 /		/ HRS)	PCN 3 DMSP								
12	130211Z	32.7N 153.0E	SAT	(1K DATA			PCN 3 DMSP								
13	130220Z	32.6N 152.8E	P	10 3	700 300	75 230	30 80 230	25 980	294	15 11	CTMC		40		1
14	130750Z	32.3N 151.6E	P	(13.5/3.5 /S		/24HRS)	NON DMSP								
15	131107Z	33.8N 153.8E	SAT	(1K DATA			NOAA-2								
16	131107Z	33.7N 153.9E	SAT	(1K DATA			PCN 3 DMSP								
17	131452Z	34.2N 154.4E	SAT	(1K DATA			PCN 5 DMSP								
18	131457Z	34.5N 154.2E	P	5 5	700 30	50 320	35 -	-	975	286	17 10	ETIP	N-S	60X30	2
19	132005Z	34.1N 154.0E	SAT	(1K DATA			NON DMSP								
20	132207Z	35.3N 155.1E	SAT	(14.0/4.0-/S		/24HRS)	PNAAA-2								
21	132207Z	35.2N 155.2E	SAT	(14.0/4.0-/		/24HRS)	PCN 1 DMSP								
22	140152Z	35.7N 155.7E	SAT	(1K DATA			PCN 1 DMSP								
23	140330Z	35.9N 155.8E	P	10 4	700 330	80 280	30 80 280	70 971	282	16 6	CTMC		40		3
24	140545Z	35.3N 155.0E	SAT	(13.5/3.5 /S		/24HRS)	NON DMSP								
25	140730Z	36.8N 156.3E	P	-	700 280	90 180	NOAA-2								
26	141049Z	37.0N 156.1E	SAT	(1K DATA			PCN 2 DMSP								
27	141049Z	37.0N 156.4E	SAT	(1K DATA			PCN 3 DMSP								
28	142039Z	39.1N 155.6E	SAT	(13.0/4.0 /W1.0/24HRS)			PCN 1 DMSP								
29	142149Z	38.8N 155.4E	SAT	(1K DATA			PCN 1 DMSP								
30	150134Z	39.6N 155.1E	SAT	(1K DATA			PCN 1 DMSP								
31	150540Z	38.2N 154.5E	SAT	(13.0/3.5 /W0.5/24HRS)			NOAA-2								
32	151031Z	39.5N 153.5E	SAT	(1K DATA			PCN 4 DMSP								
33	152010Z	40.0N 154.5E	SAT	(1K DATA			NOAA-2								
34	160115Z	41.6N 154.5E	SAT	(11.5/1.5 /		/ HRS)	PCN 4 DMSP								

TROPICAL STORM WENDY  
FIX POSITIONS FOR CYCLONE NO. 25  
0600Z 24 SEP TO 0000Z 30 SEP

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN 700MB MGT	FLT LVL TI/TO	EYE FORM	ORIENT- IATLON	EYE DIA	POSIT OF MAUAR	MSN NMHM
1	190142Z	15.6N 145.9E	SAT	(1K DATA			PCN 5 DMSP								
2	192104Z	15.5N 145.6E	SAT	(11.0/1.0 /		/ HRS)	PCN 5 DMSP								
3	192159Z	15.5N 145.5E	SAT	(1K DATA			PCN 5 DMSP								
4	201041Z	14.5N 144.8E	SAT	(1K DATA			PCN 6 DMSP								
5	201423Z	14.3N 144.6E	SAT	(1K DATA			PCN 6 DMSP								
6	202049Z	15.1N 140.5E	SAT	(11.0/1.0 /S		/24HRS)	PCN 5 DMSP								
7	202422Z	16.0N 139.6E	SAT	(1K DATA			PCN 5 DMSP								
8	210305Z	16.0N 139.3E	SAT	(1K DATA			PCN 5 DMSP								
9	211204Z	13.3N 136.6E	SAT	(1K DATA			PCN 6 DMSP								
10	212304Z	13.2N 137.3E	SAT	(1K DATA			PCN 3 DMSP								
11	221146Z	14.2N 132.9E	SAT	(1K DATA			PCN 6 DMSP								
12	230027Z	15.1N 129.3E	SAT	(11.0/1.0 /		/ HRS)	PCN 5 DMSP								
13	240009Z	17.6N 124.1E	SAT	(12.0/2.0 /		/ HRS)	PCN 5 DMSP								
14	240009Z	17.8N 124.0E	SAT	(12.0/2.0 /		/ HRS)	PCN 5 DMSP								
15	240009Z	17.8N 123.9E	SAT	(12.0/2.0 /D1.0/24HRS)			PCN 5 DMSP								
16	240553Z	17.1N 124.1E	P	3 5	700 40	30 320	60 25 20	60 1001	306	8 9	-	-	-		3
17	241251Z	16.5N 122.9E	SAT	(1K DATA			PCN 3 DMSP								
18	241251Z	14.3N 123.0E	SAT	(1K DATA			PCN 6 DMSP								
19	241251Z	16.2N 123.3E	SAT	(1K DATA			PCN 3 DMSP								
20	241700Z	17.4N 122.6E	P	5 5	700 160	50 40	40 -	-	1003	308	11 10	-	-	-	4
21	242152Z	19.0N 122.7E	P	5 2	700 140	40 40	50 25 40	50 999	304	12 10	-	-	-		4
22	242351Z	18.0N 122.0E	SAT	(11.5/2.0+/W1.0/24HRS)			PCN 5 DMSP								
23	242351Z	18.3N 121.9E	SAT	(13.0/3.0+/D1.0/24HRS)			PCN 3 DMSP								
24	242351Z	18.2N 121.8E	SAT	(12.0/2.0+/S		/24HRS)	PCN 3 DMSP								
25	250332Z	19.0N 121.0E	SAT	(1K DATA			PCN 1 DMSP								
26	250425Z	19.1N 120.9E	P	1 2	600 290	40 220	25 30 220	25 995	430	2 -	-	-	-		5
27	251252Z	19.4N 120.7E	SAT	(1K DATA			PCN 5 DMSP								
28	251252Z	19.5N 121.0E	SAT	(1K DATA			PCN 3 DMSP								
29	251252Z	19.3N 120.9E	SAT	(1K DATA			PCN 5 DMSP								
30	251452Z	19.2N 121.2E	P	1 3	600 140	37 50	120 -	-	998	431	-	-	-		5
31	252332Z	19.2N 120.9E	SAT	(11.5/2.5+/W1.5/24HRS)			PCN 5 DMSP								
32	252333Z	19.9N 120.3E	SAT	(12.0/2.0+/S		/24HRS)	PCN 3 DMSP								

## TROPICAL STORM WENDY

TROPICAL STORM WENDY  
FIX POSITIONS FOR CYCLONE NO. 25

0600Z 24 SEP TO 0000Z 30 SEP

NO.	TIME	PUSI	FIX CAT	CCKY NAV-MET	FIX LVL	FLT VEL	LVL BKG	MWD RNG	SFC WIND VEL	MIND BKG	RNG	MIN SLP	(UOM) MGT	LVL TI/TO	EYE FORM	ORIE- TATION	EYE DIA	UF MAUAR	MSN NMUN
33	260114Z	19.8N	119.4E	SAT	(12.0/2.0 /DO.5/24HRS)				PCN 5 DMSP										
34	260314Z	19.8N	120.5E	SAT	(IM DATA )				PCN 3 DMSP										
35	260336Z	19.8N	120.5E	P	2 1 700 230 40 140	15	3	140	15	997	-	-	-	CTMC		25			
36	260914Z	20.0N	120.9E	P	2 1 700 170 55 90	35	50	290	15	993	303	14	12	CTRC		30			
37	261200Z	20.1N	120.2E						NOAA-3					(CONF U1)					
38	261214Z	20.6N	120.3E	SAT	(IM DATA )				PCN 4 DMSP										
39	261214Z	20.6N	120.7E	SAT	(IM DATA )				PCN 5 DMSP										
40	261555Z	21.0N	120.5E	SAT	(IM DATA )				PCN 3 DMSP										
41	262000Z	21.2N	120.5E	LKHM	- 61111												22.6N	140.3E	
42	262100Z	21.3N	120.6E	LKHM	- 61111												22.6N	140.3E	
43	262200Z	21.3N	120.5E	LKHM	- 51111												22.6N	140.3E	
44	262220Z	21.0N	120.4E	P	1 1 700	310	50	200	33	4	992	303	14	10	-	-	-	-	
45	270000Z	21.4N	120.5E	LKHM	- 11111												22.6N	120.3E	
46	270056Z	21.2N	121.1E	SAT	(13.0/3.0 /DO.5/24HRS)				PCN 3 DMSP										
47	270255Z	21.3N	121.0E	SAT	(14.0/4.0 /DO.0/24HRS)				PCN 3 DMSP										
48	271100Z	22.2N	121.8E	LKHM	- 24922														
49	271249Z	22.8N	121.8E	P	2 1 700 270 65 170	20	-	-	-	984	296	17	10	CTMC		20			
50	271256Z	23.0N	122.0E	SAT	(IM DATA )				NOAA-3					(CONF U1)					
51	271337Z	22.6N	121.7E	SAT	(IM DATA )				PCN 5 DMSP										
52	271337Z	22.8N	122.1E	SAT	(IM DATA )				PCN 3 DMSP										
53	271536Z	23.2N	122.1E	SAT	(IM DATA )				PCN 3 DMSP										
54	271544Z	23.2N	122.2E	P	2 2 700 290 75 180	25	-	-	-	986	296	17	11	CTMC		35			
55	271600Z	23.3N	122.1E	LKHM	- 11112												24.8N	125.3E	
56	271700Z	23.5N	122.1E	LKHM	- 61112												24.3N	124.2E	
57	271700Z	23.4N	122.2E	LKHM	- 71114												24.8N	125.3E	
58	271800Z	23.4N	122.2E	LKHM	- 10932												23.9N	121.6E	
59	271800Z	23.6N	122.1E	LKHM	- 51112												24.3N	124.2E	
60	271800Z	23.5N	122.3E	LKHM	- 11114												24.8N	125.3E	
61	271900Z	23.6N	122.2E	LKHM	- 11114												24.8N	125.3E	
62	271900Z	23.6N	122.2E	LKHM	- 51112												24.3N	124.2E	
63	271900Z	23.7N	122.3E	LKHM	- 11111												24.8N	125.3E	
64	271900Z	23.7N	122.2E	LKHM	- 21912												23.9N	121.6E	
65	272000Z	23.7N	122.2E	LKHM	- 30903												24.3N	124.2E	
66	272000Z	23.8N	122.5E	LKHM	- 11111												24.8N	125.3E	
67	272000Z	23.7N	122.3E	LKHM	- 21922												23.9N	121.6E	
68	272100Z	23.8N	122.3E	LKHM	- 11111												24.8N	125.3E	
69	272200Z	24.0N	122.4E	LKHM	- 51113												24.8N	125.3E	
70	272217Z	23.7N	122.6E	P	1 2 700 290 50 210	35	5	90	10	987	298	14	-	-	-	-	-		
71	272300Z	24.0N	122.2E	LKHM	- 51114												24.3N	124.2E	
72	272300Z	23.9N	122.2E	LKHM	- 51111												24.8N	125.3E	
73	280000Z	24.1N	122.2E	LKHM	- 51112												24.3N	124.2E	
74	280000Z	24.0N	122.5E	LKHM	- 51113												24.8N	125.3E	
75	280036Z	24.3N	122.4E	SAT	(13.5/3.5 /DO.5/24HRS)				PCN 3 DMSP										
76	280100Z	24.2N	122.5E	LKHM	- 51115												24.3N	124.2E	
77	280100Z	24.2N	122.7E	LKHM	- 51115												24.8N	125.3E	
78	280200Z	24.3N	122.2E	LKHM	- PUOR FIX												26.2N	127.7E	
79	280200Z	24.4N	122.6E	LKHM	- 51112												24.3N	124.2E	
80	280200Z	24.2N	122.3E	LKHM	- 51113												24.8N	125.3E	
81	280237Z	24.5N	122.2E	SAT	(13.0/4.0 /M1.0/24HRS)				PCN 3 DMSP										
82	280247Z	24.5N	122.2E	P	1 3 700 230 70 140	25	-	-	-	986	297	13	-	-	-	-	-		
83	280300Z	24.5N	122.6E	LKHM	- 51112												24.3N	124.2E	
84	280300Z	24.6N	122.4E	LKHM	- 51113												24.8N	125.3E	
85	280600Z	24.8N	122.1E	LKHM	- 51112												24.3N	124.2E	
86	280700Z	24.8N	122.1E	LKHM	- 22853												23.9N	121.6E	
87	280700Z	24.8N	122.2E	LKHM	- 51112												24.3N	124.2E	
88	280700Z	24.7N	122.3E	LKHM	- 51113												24.8N	125.3E	
89	280800Z	24.8N	122.2E	LKHM	- 22914												24.3N	124.2E	
90	280800Z	24.8N	122.2E	LKHM	- 51113												24.8N	125.3E	
91	280900Z	24.9N	122.2E	LKHM	- 20733												23.9N	121.6E	
92	280900Z	24.8N	122.3E	LKHM	- 51113												24.8N	125.3E	
93	280900Z	24.9N	122.2E	LKHM	- 21874												24.3N	124.2E	
94	280900Z	24.8N	122.1E	LKHM	- PUOR FIX												26.2N	127.7E	
95	281000Z	24.9N	122.1E	LKHM	- 55114												24.3N	124.2E	
96	281000Z	24.9N	122.2E	LKHM	- 01111												24.8N	125.3E	
97	281100Z	24.9N	121.6E	LKHM	- PUOR FIX												26.2N	127.7E	
98	281100Z	25.1N	121.9E	LKHM	- 51111												24.8N	125.3E	
99	281157Z	25.0N	121.9E	SAT	(IM DATA )				NOAA-3					(CONF U1)					
100	281200Z	25.0N	121.9E	LKHM	-												24.3N	124.2E	
101	281200Z	25.0N	121.7E	LKHM	- 51111												24.8N	125.3E	
102	281300Z	25.0N	121.6E	LKHM	- 51112												24.3N	124.2E	
103	281319Z	24.9N	121.8E	SAT	(IM DATA )				PCN 3 DMSP										
104	281350Z	25.5N	122.5E	P	5 10 700 160 45 70	40	-	-	-	-	-	-	-	-	-	-	-		
105	290019Z	25.2N	120.9E	SAT	(IM DATA )				PCN 3 DMSP										
106	290019Z	25.1N	120.4E	SAT	(11.5/2.5 /M1.0/24HRS)				PCN 3 DMSP										
107	290019Z	25.2N	120.6E	SAT	(11.5/3.0 / / HRS)				PCN 3 DMSP										
108	290359Z	25.8N	120.7E	SAT	(11.5/3.0 / / HRS)				PCN 3 DMSP										
109	290359Z	25.0N	120.6E	SAT	(IM DATA )				PCN 3 DMSP										
110	291301Z	25.4N	120.7E	SAT	(IM DATA )				PCN 5 DMSP										
111	291301Z	25.5N	120.6E	SAT	(IM DATA )				PCN 5 DMSP										
112	291301Z	25.4N	121.1E	SAT	(IM DATA )				PCN 5 DMSP										
113	300001Z	26.0N	120.1E	SAT	(11.0/1.5 /M0.5/24HRS)				PCN 5 DMSP										
114	300001Z	25.9N	121.2E	SAT	(11.5/2.5 /M1.5/24HRS)				PCN 5 DMSP										
115	300001Z	26.0N	121.0E	SAT	(11.5/2.5-/M1.5/24HRS)				PCN 3 DMSP										
116	300341Z	25.9N	121.5E	SAT	(IM DATA )				PCN 3 DMSP										
117	300341Z	25.8N	121.4E	SAT	(IM DATA )				PCN 3 DMSP										

TYPHOON AGNES  
FIX POSITIONS FOR CYCLONE NO. 26  
1800Z 24 SEP TO 0000Z 02 OCT

FIA NO.	TIME	POSIT	FIX CAT	ACQRY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG RRG	MAX OBS SFC WIND VEL BRG RRG	OBS MIN SLP	MIN F00MB HGT	FLI LVL T1/T0	EYE F00MB	ORIENT- IAT10N	EYE DIA	POSIT OF KAUKAR	MSN NMBR
1	201017Z	14.5N 145.0E	SAT	(IM DATA			NOAA-3			(CONF U1)					
2	201041Z	15.8N 159.0E	SAT	(IM DATA			PCN 6 DMSP								
3	202049Z	16.0N 160.0E	SAT	(IM DATA			PCN 5 DMSP								
4	202141Z	16.1N 159.6E	SAT	(11.0/1.0 /	/ HRS)		PCN 5 DMSP								
5	210030Z	15.0N 140.0E	SAT	(11.5/2.5 /W1.5/25HMS)			NOAA-3			(CONF U2)					
6	210124Z	17.6N 162.1E	SAT	(IM DATA			PCN 5 DMSP								
7	211022Z	16.2N 159.3E	SAT	(IM DATA			PCN 6 DMSP								
8	211113Z	15.0N 138.0E	SAT	(IM DATA			NOAA-3			(CONF U2)					
9	212033Z	17.2N 157.0E	SAT	(IM DATA			PCN 5 DMSP								
10	212133Z	17.2N 157.0E	SAT	(11.0/1.0 /S	/24HMS)		PCN 5 DMSP								
11	221004Z	21.0N 158.3E	SAT	(IM DATA			PCN 6 DMSP								
12	222018Z	22.3N 158.6E	SAT	(IM DATA			PCN 6 DMSP								
13	222104Z	22.3N 158.4E	SAT	(1.0/2.0 /	/ HRS)		PCN 4 DMSP								
14	222227Z	22.2N 157.8E	SAT	(11.5/1.5 /00.5/24HMS)			NOAA-3			(CONF U1)					
15	230046Z	22.5N 157.9E	SAT	(IM DATA			PCN 3 DMSP								
16	230915Z	22.0N 156.2E	SAT	(IM DATA			NOAA-3			(CONF U2)					
17	230946Z	22.5N 157.8E	SAT	(IM DATA			PCN 6 DMSP								
18	232002Z	22.5N 154.8E	SAT	(12.0/2.0 /S	/23HMS)		PCN 3 DMSP								
19	232228Z	22.3N 155.3E	SAT	(12.0/2.0 /	/ HRS)		PCN 3 DMSP								
20	232228Z	22.4N 155.0E	SAT	(IM DATA			PCN 3 DMSP								
21	232322Z	22.8N 156.1E	SAT	(12.5/2.5 /00.5/24HMS)			NOAA-3			(CONF U1)					
22	240300Z	22.4N 155.4E	P	10 10 700 20 25 340			40 20 40 20 999 308 25 - - - -							2	
23	241109Z	23.1N 156.2E	SAT	(IM DATA			PCN 5 DMSP								
24	241109Z	22.7N 154.9E	SAT	(IM DATA			PCN 3 DMSP								
25	241947Z	22.9N 153.9E	SAT	(12.5/2.5 /00.5/24HMS)			PCN 5 DMSP								
26	242209Z	23.0N 153.5E	SAT	(12.5/2.5 /00.5/24HMS)			PCN 5 DMSP								
27	242209Z	23.4N 154.0E	SAT	(IM DATA			PCN 3 DMSP								
28	242227Z	23.9N 154.9E	SAT	(13.5/3.5 /01.0/23HMS)			NOAA-3			(CONF U1)					
29	250830Z	23.6N 154.0E	SAT	(IM DATA			PCN 2 DMSP								
30	250911Z	23.9N 155.0E	SAT	(IM DATA			NOAA-3			(CONF U2)					
31	251051Z	24.3N 153.9E	SAT	(IM DATA			PCN 6 DMSP								
32	251051Z	23.7N 153.9E	SAT	(IM DATA			PCN 5 DMSP								
33	251650Z	23.9N 153.2E	P	3 7 700 360 40 280			30 - - - 70 996 306 10 15 - - - -						3		
34	252000Z	24.0N 153.0E	P	5 5 700 150 45 250			100 30 60 70 996 306 10 14 - - - -						3		
35	252151Z	24.5N 152.6E	SAT	(14.0/4.0 /01.5/24HMS)			PCN 3 DMSP								
36	252151Z	24.5N 152.7E	SAT	(13.5/3.5 /01.0/20HMS)			PCN 3 DMSP								
37	252317Z	24.2N 152.6E	SAT	(14.0/4.0 /00.5/23HMS)			NOAA-3			(CONF U1)					
38	260132Z	24.6N 152.3E	SAT	(IM DATA			PCN 3 DMSP								
39	261006Z	25.0N 152.2E	SAT	(IM DATA			NOAA-3			(CONF U1)					
40	261033Z	24.6N 151.7E	SAT	(IM DATA			PCN 4 DMSP								
41	261033Z	24.6N 151.8E	SAT	(IM DATA			PCN 5 DMSP								
42	261450Z	24.5N 151.9E	P	3 5 700 40 70 270			15 - - - 984 296 18 12 - - - -						5		
43	262058Z	24.7N 151.4E	SAT	(IM DATA			PCN 5 DMSP								
44	262133Z	24.7N 150.9E	SAT	(14.5/4.5 /01.0/24HMS)			PCN 3 DMSP								
45	262134Z	24.6N 151.0E	SAT	(14.5/4.5 /00.5/24HMS)			PCN 3 DMSP								
46	262217Z	24.8N 150.9E	SAT	(15.0/5.0 /01.0/23HMS)			NOAA-3			(CONF U1)					
47	270114Z	24.9N 150.9E	SAT	(IM DATA			PCN 3 DMSP								
48	270231Z	25.2N 150.8E	P	20 3 700 40 60 330			18 70 330 30 978 292 17 14 CIRC 30 - - - -						6		
49	270941Z	25.2N 150.0E	SAT	(IM DATA			PCN 5 DMSP								
50	270941Z	25.4N 150.6E	SAT	(IM DATA			PCN 5 DMSP								
51	271014Z	25.4N 150.7E	SAT	(IM DATA			PCN 5 DMSP								
52	271156Z	25.2N 150.4E	SAT	(IM DATA			PCN 5 DMSP								
53	271156Z	25.3N 150.6E	SAT	(IM DATA			PCN 5 DMSP								
54	271355Z	25.7N 150.3E	SAT	(IM DATA			PCN 5 DMSP								
55	271827Z	26.3N 150.5E	P	1 5 700 330 85 240			40 - - - 970 285 20 11 CIRC 40 - - - -						7		
56	272043Z	26.3N 151.0E	SAT	(14.0/4.5 /W0.5/23HMS)			PCN 3 DMSP								
57	272256Z	26.2N 150.7E	SAT	(14.0/4.5 /W0.5/23HMS)			PCN 3 DMSP								
58	272256Z	26.2N 150.8E	SAT	(IM DATA			PCN 3 DMSP								
59	272311Z	26.0N 150.1E	SAT	(15.0/5.0 /S	/24HMS)		NOAA-3			(CONF U1)					
60	280033Z	26.5N 150.5E	SAT	(IM DATA			PCN 3 DMSP								
61	280350Z	26.9N 150.3E	P	10 5 700 290 85 190			50 60 190 50 968 283 16 16 - - - -						8		
62	280925Z	27.1N 150.9E	SAT	(IM DATA			PCN 6 DMSP								
63	280925Z	27.6N 150.5E	SAT	(IM DATA			PCN 4 DMSP								
64	281138Z	27.8N 150.5E	SAT	(IM DATA			PCN 5 DMSP								
65	281138Z	27.8N 150.5E	SAT	(IM DATA			PCN 5 DMSP								
66	281336Z	28.3N 150.5E	SAT	(IM DATA			PCN 5 DMSP								
67	281152Z	26.7N 150.4E	P	5 10 700 260 75 180			45 - - - 970 285 16 12 - - - -						9		
68	282027Z	28.9N 150.8E	SAT	(14.0/4.0 /S	/24HMS)		PCN 3 DMSP								
69	282211Z	29.2N 150.5E	SAT	(14.5/5.0 /W0.5/24HMS)			NOAA-3			(CONF U2)					
70	282238Z	29.2N 151.7E	SAT	(14.5/4.5 /01.0/24HMS)			PCN 4 DMSP								
71	282238Z	29.2N 151.8E	SAT	(IM DATA			PCN 5 DMSP								
72	290036Z	29.6N 151.6E	SAT	(IM DATA			PCN 3 DMSP								
73	290318Z	29.8N 152.2E	P	10 2 700 290 85 240			105 50 10 60 968 284 16 17 - - - -						10		
74	290909Z	30.2N 153.3E	SAT	(IM DATA			PCN 6 DMSP								
75	290910Z	29.9N 153.2E	SAT	(IM DATA			PCN 6 DMSP								
76	291119Z	29.7N 153.4E	SAT	(IM DATA			PCN 5 DMSP								
77	291119Z	29.9N 153.5E	SAT	(IM DATA			PCN 5 DMSP								
78	291459Z	30.1N 154.2E	SAT	(IM DATA			PCN 5 DMSP								
79	291515Z	30.0N 154.0E	P	2 2 700 350 85 260			90 - - - 970 285 16 14 - - - -						11		
80	292012Z	30.7N 155.0E	SAT	(13.0/4.0 /W1.0/24HMS)			PCN 3 DMSP								
81	292219Z	30.4N 155.7E	SAT	(15.0/5.0 /00.5/24HMS)			PCN 3 DMSP								
82	292219Z	30.1N 155.4E	SAT	(IM DATA			PCN 4 DMSP								
83	300303Z	30.7N 156.5E	P	20 2 700 300 105 210			75 100 190 55 961 277 16 14 CIRC 20 - - - -						12		
84	300854Z	32.3N 158.8E	SAT	(IM DATA			PCN 6 DMSP								
85	300854Z	31.9N 158.7E	SAT	(IM DATA			PCN 6 DMSP								
86	300958Z	32.6N 159.8E	SAT	(IM DATA			NOAA-3			(CONF U1)					
87	301101Z	32.3N 159.5E	SAT	(IM DATA			PCN 3 DMSP								
88	301101Z	32.2N 159.1E	SAT	(IM DATA			PCN 3 DMSP								
89	301441Z	32.5N 160.9E	SAT	(IM DATA			PCN 5 DMSP								
90	301441Z	32.5N 160.4E	SAT	(IM DATA			PCN 3 DMSP								
91	301447Z	33.3N 161.8E	P	5 5 700 330 85 250			130 60 250 130 963 276 17 14 - - - -						13		
92	301956Z	33.8N 161.5E	SAT	(14.0/5.0 /W1.0/24HMS)			PCN 4 DMSP								
93	301956Z	34.1N 162.8E	SAT	(IM DATA			PCN 3 DMSP								
94	302025Z	33.9N 162.1E	SAT	(12											

TYPHOON BESS  
FIX POSITIONS FOR CYCLONE NO. 27  
0600Z 08 OCT TO 0600Z 14 OCT

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS DIR VEL	FLT LVL	WIND BKG	MAX OBS SFC WIND VEL	WIND BRG	WIND RNG	MIN (UOMB) SLP	FLT LVL	WIND T1/T0	EYE FORM	UNEN-TATION	EYE DIA	POSIT OF MAUAN	MSN NMGR
1	052258Z	10.0N 149.0E	SAT	(11.5/1.5 / 00.5/24HRS)					NOAA-3			(CONF U1)							
2	061132Z	11.0N 146.0E	SAT	(1R DATA)					NOAA-3			(CONF U3)							
3	062335Z	10.0N 143.7E	SAT	(11.0/1.0 / / HRS)					PCN 5 UMSP										
4	062353Z	10.5N 142.4E	SAT	(12.0/2.0 / 00.5/25HRS)					NOAA-3			(CONF U3)							
5	070131Z	10.0N 143.2E	SAT	(1R DATA)					PCN 5 UMSP										
6	071034Z	11.0N 139.0E	SAT	(1R DATA)					NOAA-3			(CONF U1)							
7	071216Z	10.6N 136.5E	SAT	(1R DATA)					PCN 5 UMSP										
8	072132Z	11.8N 136.9E	SAT	(11.5/1.5 / 00.5/24HRS)					PCN 5 UMSP										
9	072253Z	11.0N 136.0E	SAT	(12.5/2.5 / 00.5/24HRS)					NOAA-3			(CONF U2)							
10	072316Z	12.0N 136.5E	SAT	(1R DATA)					PCN 5 UMSP										
11	072316Z	11.8N 135.1E	SAT	(11.5/1.5 / / HRS)					PCN 5 UMSP										
12	080254Z	11.9N 135.9E	SAT	(1R DATA)					PCN 3 UMSP										
13	080440Z	11.9N 135.3E	P	3 3 1500	140	30	70	30	30	30	20	999	-	25	25	-	-	-	1
14	080920Z	12.0N 134.1E	P	2 8 700	140	45	40	100	35	70	100	1003	308	10	11	-	-	-	1
15	081014Z	13.1N 133.0E	SAT	(1R DATA)					PCN 6 UMSP										
16	081015Z	12.1N 133.6E	SAT	(1R DATA)					PCN 6 UMSP										
17	081127Z	13.2N 133.5E	SAT	(1R DATA)					NOAA-3			(CONF U2)							
18	081158Z	12.3N 133.4E	SAT	(1R DATA)					PCN 5 UMSP										
19	081535Z	12.6N 133.2E	SAT	(1R DATA)					PCN 5 UMSP										
20	081740Z	12.7N 131.6E	P	2 5 700	320	20	180	20	-	-	-	1002	307	8	8	CTNC	35	2	
21	082058Z	13.0N 130.2E	P	2 2 700	320	30	120	30	-	-	-	999	308	10	9	CTNC	30	2	
22	082116Z	13.5N 130.7E	SAT	(1R DATA)					PCN 5 UMSP										
23	082258Z	15.4N 132.3E	SAT	(12.5/2.5 / 01.0/24HRS)					PCN 5 UMSP										
24	082300Z	15.7N 131.8E	SAT	(12.0/2.0 / 00.5/25HRS)					PCN 5 UMSP										
25	082347Z	13.5N 130.6E	SAT	(12.5/2.5 / 22HRS)					NOAA-3			(CONF U2)							
26	090235Z	16.0N 130.7E	SAT	(1R DATA)					PCN 5 UMSP										
27	090235Z	16.4N 131.1E	SAT	(1R DATA)					PCN 5 UMSP										
28	090320Z	16.0N 130.3E	P	15 10 700	170	50	120	57	35	120	30	998	306	11	10	ELIP	SE-NW	40X15	3
29	090830Z	16.2N 128.8E	P	10 40 700	-	-	-	-	40	340	72	995	305	12	-	-	-	-	3
30	090959Z	16.7N 128.1E	SAT	(1R DATA)					PCN 6 UMSP										
31	090959Z	16.1N 128.4E	SAT	(1R DATA)					PCN 5 UMSP										
32	091139Z	16.3N 127.6E	SAT	(1R DATA)					PCN 5 UMSP										
33	091139Z	15.4N 127.6E	SAT	(1R DATA)					PCN 5 UMSP										
34	091225Z	16.0N 128.0E	SAT	(1R DATA)					NOAA-3			(CONF U2)							
35	091517Z	16.3N 126.8E	SAT	(1R DATA)					PCN 5 UMSP										
36	091517Z	16.2N 126.7E	SAT	(1R DATA)					PCN 5 UMSP										
37	091730Z	15.9N 127.6E	P	5 5 700	190	30	90	47	-	-	-	987	297	13	-	-	-	-	4
38	092224Z	16.7N 126.5E	P	5 5 700	160	60	80	100	5	80	100	986	298	13	-	-	-	-	4
39	100021Z	16.6N 126.4E	SAT	(13.0/3.0 / 01.0/25HRS)					PCN 3 UMSP										
40	100445Z	16.7N 125.5E	P	3 1 700	140	60	70	85	65	70	100	985	297	13	13	-	-	-	5
41	100558Z	15.6N 126.3E	SAT	(13.0/3.0 / / HRS)					PCN 5 UMSP										
42	100907Z	17.2N 125.2E	P	2 2 700	160	65	50	50	75	130	70	980	293	14	12	CTNC	20	5	
43	101303Z	17.1N 124.6E	SAT	(1R DATA)					PCN 5 UMSP										
44	101319Z	18.0N 124.0E	SAT	(1R DATA)					NOAA-3			(CONF U1)							
45	101454Z	17.6N 123.3E	P	10 25 700	190	35	90	20	-	-	-	981	288	17	15	-	-	-	6
46	102227Z	17.5N 122.7E	SAT	(15.0/5.0 / 02.0/24HRS)					PCN 3 UMSP										
47	102227Z	17.1N 122.5E	SAT	(15.5/5.5 / / HRS)					PCN 2 UMSP										
48	102227Z	17.5N 122.5E	SAT	(13.5/3.5 / 00.5/18HRS)					PCN 4 UMSP										
49	110003Z	18.1N 122.1E	SAT	(1R DATA)					PCN 3 UMSP										
50	110003Z	18.0N 122.2E	SAT	(15.0/5.0 / / HRS)					PCN 3 UMSP										
51	110003Z	17.8N 122.2E	SAT	(1R DATA)					PCN 2 UMSP										
52	110136Z	18.0N 121.3E	SAT	(14.0/4.0 / 01.5/25HRS)					NOAA-3			(CONF U1)							
53	110340Z	17.9N 121.0E	SAT	(1R DATA)					PCN 5 UMSP										
54	110340Z	17.7N 121.3E	SAT	(1R DATA)					PCN 2 UMSP										
55	110340Z	18.0N 121.4E	SAT	(1R DATA)					PCN 4 UMSP										
56	111110Z	18.5N 119.9E	SAT	(1R DATA)					PCN 6 UMSP										
57	111110Z	18.5N 119.4E	SAT	(1R DATA)					PCN 6 UMSP										
58	111221Z	18.0N 120.0E	SAT	(1R DATA)					NOAA-3			(CONF U2)							
59	111244Z	18.6N 119.6E	SAT	(1R DATA)					PCN 3 UMSP										
60	111621Z	18.0N 119.1E	SAT	(1R DATA)					PCN 5 UMSP										
61	111645Z	18.2N 119.5E	P	2 2 700	230	60	170	50	-	-	-	982	293	13	13	-	-	-	7
62	112212Z	18.0N 118.5E	SAT	(1R DATA)					PCN 5 UMSP										
63	112233Z	18.8N 118.5E	P	2 1 700	130	75	30	80	5	30	30	980	293	13	13	-	-	-	7
64	112344Z	18.5N 118.0E	SAT	(13.5/4.5 / 01.5/25HRS)					PCN 5 UMSP										
65	120036Z	19.0N 118.0E	SAT	(13.5/4.0 / 00.5/25HRS)					NOAA-3			(CONF U1)							
66	120126Z	18.3N 119.0E	SAT	(14.5/4.5 / 00.5/24HRS)					PCN 5 UMSP										
67	120321Z	19.1N 117.8E	SAT	(1R DATA)					PCN 3 UMSP										
68	120321Z	19.0N 118.1E	SAT	(1R DATA)					PCN 5 UMSP										
69	120441Z	19.1N 117.1E	P	3 3 700	230	75	120	40	5	120	45	982	294	15	13	-	-	-	8
70	121055Z	19.0N 117.5E	SAT	(1R DATA)					PCN 6 UMSP										
71	121055Z	19.8N 116.9E	SAT	(1R DATA)					PCN 6 UMSP										
72	121055Z	17.8N 116.3E	SAT	(1R DATA)					PCN 6 UMSP										
73	121226Z	19.0N 117.3E	SAT	(1R DATA)					PCN 5 UMSP										
74	121226Z	19.3N 116.8E	SAT	(1R DATA)					PCN 5 UMSP										
75	121316Z	19.5N 114.8E	SAT	(1R DATA)					NOAA-3			(CONF U2)							
76	121602Z	19.4N 116.1E	SAT	(1R DATA)					PCN 5 UMSP										
77	121602Z	19.2N 114.5E	SAT	(1R DATA)					PCN 6 UMSP										
78	121602Z	20.0N 114.0E	SAT	(1R DATA)					PCN 5 UMSP										
79	122338Z	19.2N 112.5E	SAT	(1R DATA)					PCN 5 UMSP										
80	122338Z	20.0N 112.9E	SAT	(12.5/3.0 / 02.0/24HRS)					PCN 6 UMSP										
81	130108Z	19.1N 113.2E	SAT	(13.0/3.0 / / HRS)					PCN 3 UMSP										
82	130108Z	19.9N 112.2E	SAT	(1R DATA)					PCN 5 UMSP										
83	130130Z	19.2N 111.1E	SAT	(12.0/3.0 / 01.0/24HRS)					NOAA-3			(CONF U2)							
84	130444Z	19.0N 112.8E	SAT	(1R DATA)					PCN 3 UMSP										
85	130444Z	18.9N 112.6E	SAT	(1R DATA)					PCN 3 UMSP										
86	131217Z	20.2N 110.0E	SAT	(1R DATA)					NOAA-3			(CONF U2)							
87	131221Z	19.3N 110.6E	SAT	(1R DATA)					PCN 6 UMSP										
88	131221Z	19.8N 110.0E	SAT	(1R DATA)					PCN 6 UMSP										
89	131349Z	19.6N 109.9E	SAT	(1R DATA)					PCN 5 UMSP										
90	131725Z	19.0N 108.2E	SAT	(1R DATA)					PCN 5 UMSP										
91	132323Z	19.1N 107.2E	SAT	(11.0/1.5 / 01.0/24HRS)					PCN 5 UMSP										
92	140053Z	12.8N 133.5E	SAT	(12.0/2.0 / 00.5/24HRS)					NOAA-3			(CONF U2)							
93																			

TYPHOON CARMEN  
FIX POSITIONS FOR CYCLONE NO. 28  
1200Z 14 OCT TO 1200Z 19 OCT

FIX NO.	TIME	POSIT	FIX CAT	ACQRY NAV-MET	FIX LVL	MAX OBS FLT DIR	MAX OBS LVL VEL	MAX OBS SFC WIND BRG	MAX OBS VEL	MAX OBS BRG	UWS MIN SLP	MIN 700MB HGT	FLT LVL	EYE FORM	ORIEN- TATION	EYE DIA	POSIT OF HAUAR	MSN NMBR
1	122326Z	12.2N 132.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
2	130302Z	12.2N 132.4E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
3	131039Z	11.5N 132.9E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
4	131157Z	21.2N 114.5E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
5	131208Z	11.5N 132.3E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
6	131544Z	11.5N 133.0E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
7	132141Z	11.7N 131.6E	SAT	(11.5/1.5 /	00.5/22HRS)			PCN 5	UMSP									
8	132308Z	11.3N 133.1E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
9	132308Z	11.7N 131.6E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
10	140244Z	12.5N 131.5E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
11	141024Z	11.7N 130.3E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
12	141149Z	12.1N 130.2E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
13	141525Z	12.0N 129.0E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
14	141525Z	12.2N 129.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
15	142307Z	12.4N 126.0E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
16	150031Z	11.6N 126.8E	SAT	(12.5/2.5 /		/	MRS)	PCN 5	UMSP									
17	150031Z	11.8N 126.1E	SAT	(13.0/3.0 /	01.5/27HRS)			PCN 5	UMSP									
18	150225Z	12.5N 126.0E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
19	151009Z	13.4N 126.9E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
20	151228Z	13.4N 125.3E	P	5	20	700					993	303	14					2
21	151507Z	14.4N 125.7E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
22	151507Z	14.7N 125.2E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
23	151528Z	14.3N 125.0E	P	5	5	700	110	55	30	80								2
24	152200Z	14.7N 123.8E	LHOM								985	300	12	8				
25	152252Z	16.0N 123.6E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP								13.1N 123.7E	
26	160013Z	15.4N 123.7E	SAT	(14.5/4.5 /		/	MRS)	PCN 1	UMSP									
27	160013Z	15.5N 123.8E	SAT	(14.5/4.5 /	01.5/24HRS)			PCN 1	UMSP									
28	160210Z	15.5N 123.4E	LHOM														18.2N 120.5E	
29	160300Z	15.6N 123.1E	LHOM														18.1N 120.5E	
30	160348Z	15.4N 123.6E	SAT	(15.0/5.0 /		/	MRS)	PCN 1	UMSP									
31	160400Z	15.6N 122.9E	LHOM														18.1N 120.5E	
32	160448Z	15.4N 122.9E	P	5	5	700	170	62	100	80								3
33	160710Z	16.3N 122.7E	LHOM														18.1N 120.5E	
34	160810Z	16.6N 122.6E	LHOM														18.1N 120.5E	
35	160910Z	16.3N 122.3E	LHOM														18.1N 120.5E	
36	161131Z	17.0N 121.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 4	UMSP								18.1N 120.5E	
37	161135Z	16.4N 121.1E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
38	161254Z	16.3N 121.9E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
39	161254Z	16.4N 121.4E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
40	161630Z	16.9N 120.1E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
41	161930Z	17.4N 119.8E	LHOM														16.6N 120.3E	
42	162237Z	17.3N 119.1E	SAT	(14.0/5.0 /	01.0/24HRS)			PCN 1	UMSP									
43	162237Z	18.0N 118.6E	SAT	(11.0/1.0 /		/	MRS)	PCN 3	UMSP									
44	162237Z	17.8N 118.4E	SAT	(14.5/5.0 /	00.5/19HRS)			PCN 1	UMSP									
45	162355Z	18.5N 118.6E	SAT	(12.5/3.5 /	01.0/24HRS)			PCN 5	UMSP									
46	162355Z	18.0N 118.3E	SAT	(14.5/4.5 /	00.5/24HRS)			PCN 1	UMSP									
47	170329Z	18.4N 117.2E	SAT	(15.0/5.5 /	00.5/24HRS)			PCN 1	UMSP									
48	170330Z	18.4N 117.8E	SAT	(12.5/3.5 /	01.0/24HRS)			PCN 3	UMSP									
49	170330Z	18.4N 117.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 3	UMSP									
50	170330Z	18.4N 117.9E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
51	170330Z	18.1N 117.6E	SAT	(11.0/1.0 /		/	MRS)	PCN 3	UMSP									
52	170531Z	18.4N 117.5E	P	3	5	700	170	45	70	100	50	70	85	980	292	14	13	
53	170948Z	18.6N 116.9E	P	5	5	700	130	48	50	60	55	50	80	979	291	14	12	
54	171120Z	18.7N 116.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 2	UMSP									
55	171120Z	18.5N 116.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 4	UMSP									
56	171236Z	18.9N 116.5E	SAT	(11.0/1.0 /		/	MRS)	PCN 2	UMSP									
57	171236Z	19.2N 116.4E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
58	171236Z	18.9N 116.6E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
59	171243Z	20.0N 117.0E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
60	171611Z	19.0N 116.0E	SAT	(11.0/1.0 /		/	MRS)	PCN 2	UMSP									
61	171611Z	19.6N 116.2E	SAT	(11.0/1.0 /		/	MRS)	PCN 6	UMSP									
62	171611Z	19.3N 116.1E	SAT	(11.0/1.0 /		/	MRS)	PCN 3	UMSP									
63	171611Z	19.1N 115.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 5	UMSP									
64	171800Z	19.8N 115.9E	LHOM															
65	172211Z	19.7N 115.6E	SAT	(11.0/1.0 /		/	MRS)	PCN 3	UMSP								22.3N 114.2E	
66	172211Z	19.4N 115.3E	SAT	(15.5/5.5 /	01.0/24HRS)			PCN 2	UMSP									
67	180000Z	20.2N 115.3E	LHOM														22.3N 114.2E	
68	180200Z	20.1N 114.7E	LHOM														22.3N 114.2E	
69	180300Z	20.1N 114.8E	LHOM														22.3N 114.2E	
70	180311Z	20.1N 115.4E	SAT	(14.5/4.5 /	02.0/27HRS)			PCN 3	UMSP									
71	180311Z	19.9N 115.3E	SAT	(15.0/5.0 /	00.5/27HRS)			PCN 1	UMSP									
72	180311Z	19.9N 115.5E	SAT	(11.0/1.0 /		/	MRS)	PCN 3	UMSP									
73	180400Z	20.3N 114.9E	LHOM														22.3N 114.2E	
74	180600Z	20.5N 115.1E	LHOM														22.3N 114.2E	
75	180700Z	20.3N 115.0E	LHOM														22.3N 114.2E	
76	180800Z	20.3N 114.9E	LHOM														22.3N 114.2E	
77	180900Z	20.3N 114.9E	LHOM														22.3N 114.2E	
78	181000Z	20.4N 114.8E	LHOM														22.3N 114.2E	
79	181100Z	20.5N 114.8E	LHOM														22.3N 114.2E	
80	181104Z	20.0N 114.2E	SAT															
81	181104Z	20.3N 114.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 2	UMSP									
82	181104Z	20.3N 114.8E	SAT	(11.0/1.0 /		/	MRS)	PCN 2	UMSP									
83	181200Z	20.5N 114.5E	LHOM															
84	181300Z	20.5N 114.3E	LHOM														22.3N 114.2E	
85	181400Z	20.5N 114.6E	LHOM														22.3N 114.2E	
86	181500Z	20.5N 114.5E	LHOM														22.3N 114.2E	
87	181522Z	20.8N 114.5E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
88	181522Z	20.6N 114.3E	SAT	(11.0/1.0 /		/	MRS)	PCN 1	UMSP									
89	181522Z	20.6N 114.6E	SAT	(11.0/1.0 /		/	MRS)	PCN 3	UMSP									
90	181600Z	20.6N 114.4E	LHOM														22.3N 114.2E	
91	181700Z	20.6N 114.3E	LHOM														22.3N 114.2E	
92	181800Z	20.7N 114.2E	LHOM														22.3N 114.2E	
93	181900Z	20.8N 114.2E	LHOM														22.3N 114.2E	
94	182000Z	20.9N 114.2E	LHOM														22.3N 114.2E	
95	182300Z	21.2N 113.8E	LHOM														22.3N 114.2E	
96	182348Z																	

TYPHOON CARMEN  
FIX POSITIONS FOR CYCLONE NO. 28  
1200Z 14 OCT TO 1200Z 19 OCT

FIX NO.	TIME	POSIT	FIX CAT	ACCKY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VLL BKG RRG	MAX OBS SFC WIND VLL BKG RRG	UWS MIN SLP	MIN (UWS) MGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMHM
101	190434Z	21.4N 113.3E	SAT	(IR DATA				PCN 3 UMSF							
102	190500Z	21.4N 112.9E	LHUM	- 20913											
103	190700Z	21.4N 112.7E	LHUM	- 20913										22.3N 114.2E	
104	191231Z	21.3N 111.9E	SAT	(IR DATA				PCN 4 UMSF						22.3N 114.2E	
105	191308Z	22.0N 112.0E	SAT	(IR DATA				NOAA-3	(CONF 01)						

TYPHOON BELLA  
FIX POSITIONS FOR CYCLONE NO. 29  
0000Z 21 OCT TO 0000Z 27 OCT

FIX NO.	TIME	POSIT	FIX CAT	ACCKY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VLL BKG RRG	MAX OBS SFC WIND VLL BKG RRG	UWS MIN SLP	MIN (UWS) MGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMHM
1	172155Z	9.3N 150.8E	SAT	(11.0/1.0 /				PCN 5 UMSF							
2	182206Z	9.8N 143.1E	SAT	(IR DATA				PCN 5 UMSF							
3	182225Z	11.0N 142.0E	SAT	(11.5/1.5 /D0.5/24HMS)				NOAA-3	(CONF 02)						
4	182318Z	11.3N 142.9E	SAT	(11.5/1.5 /D0.5/24HMS)				PCN 5 UMSF							
5	190252Z	11.0N 141.6E	SAT	(IR DATA				PCN 5 UMSF							
6	190907Z	11.2N 139.7E	SAT	(IR DATA				PCN 6 UMSF							
7	191049Z	12.0N 139.3E	SAT	(IR DATA				PCN 6 UMSF							
8	191110Z	13.5N 137.5E	SAT	(IR DATA				NOAA-3	(CONF 02)						
9	191200Z	12.2N 138.8E	SAT	(IR DATA				PCN 6 UMSF							
10	191534Z	13.0N 137.6E	SAT	(IR DATA				PCN 6 UMSF							
11	192150Z	11.8N 135.0E	SAT	(12.0/2.5+ /				PCN 6 UMSF							
12	192150Z	13.5N 135.8E	SAT	(11.5/1.5 /S /24HMS)				PCN 3 UMSF							
13	192300Z	13.4N 135.1E	SAT	(11.5/1.5 /				PCN 5 UMSF							
14	192300Z	13.7N 135.5E	SAT	(IR DATA				PCN 3 UMSF							
15	192335Z	12.0N 134.6E	SAT	(12.0/2.0 /D0.5/24HMS)				NOAA-3	(CONF 01)						
16	200234Z	13.7N 133.7E	SAT	(IR DATA				PCN 5 UMSF							
17	201033Z	12.0N 132.8E	SAT	(IR DATA				PCN 6 UMSF							
18	201141Z	12.4N 132.8E	SAT	(IR DATA				PCN 5 UMSF							
19	201219Z	11.5N 131.5E	SAT	(IR DATA				NOAA-3	(CONF 01)						
20	201515Z	12.5N 132.0E	SAT	(IR DATA				PCN 5 UMSF							
21	202135Z	12.0N 128.9E	SAT	(IR DATA				PCN 5 UMSF							
22	210023Z	13.8N 129.5E	SAT	(12.5/3.0+ /D0.5/				PCN 3 UMSF							
23	210023Z	12.8N 129.3E	SAT	(13.0/3.0 /D1.5/24HMS)				PCN 3 UMSF							
24	210023Z	12.9N 129.3E	SAT	(12.5/2.5 /D1.0/24HMS)				PCN 3 UMSF							
25	210046Z	12.6N 129.1E	SAT	(13.5/3.5 /D2.0/24HMS)				NOAA-3	(CONF 01)						
26	210215Z	13.4N 129.0E	SAT	(IR DATA				PCN 5 UMSF							
27	210320Z	13.3N 128.3E	P	2 5 700 150 40 70				40 40 70 30	990 305 11	-	-	-	-	2	
28	210841Z	14.0N 127.7E	P	4 700 180 40 90				50 40 90 80	992 300 11	-	-	-	-	2	
29	211018Z	14.0N 127.2E	SAT	(IR DATA				PCN 6 UMSF							
30	211018Z	14.2N 127.6E	SAT	(IR DATA				PCN 4 UMSF							
31	211136Z	15.0N 127.3E	SAT	(IR DATA				NOAA-3	(CONF 02)						
32	211457Z	15.0N 126.0E	SAT	(IR DATA				PCN 4 UMSF							
33	211457Z	14.8N 126.7E	SAT	(IR DATA				PCN 3 UMSF							
34	211825Z	15.6N 125.5E	P	15 15 700 190 55 110				70 - -	991 300 13 12	-	-	-	-	3	
35	212210Z	16.1N 125.3E	P	5 5 700 120 60 30				55 60 40 65	989 299 13 12	ETP	N-S	50X20		3	
36	220005Z	16.4N 125.5E	SAT	(14.0/4.0+ /D1.0/24HMS)				PCN 3 UMSF							
37	220005Z	16.2N 125.3E	SAT	(13.5/3.5 /D1.0/24HMS)				PCN 3 UMSF							
38	220338Z	16.6N 124.9E	SAT	(12.0/2.0 /				PCN 5 UMSF							
39	220338Z	16.9N 124.7E	SAT	(IR DATA				PCN 3 UMSF							
40	220338Z	16.9N 125.2E	SAT	(IR DATA				PCN 3 UMSF							
41	220340Z	16.5N 123.7E	LHUM	-											
42	220900Z	17.8N 124.7E	P	2 2 700 60 50 330				40 65 330 40	982 293 12 11	CTMC	-	-	20	4	
43	221144Z	18.4N 123.8E	SAT	(IR DATA				PCN 6 UMSF							
44	221246Z	19.1N 124.2E	SAT	(IR DATA				PCN 4 UMSF							
45	221246Z	18.7N 123.8E	SAT	(IR DATA				PCN 1 UMSF							
46	221247Z	14.0N 123.8E	SAT	(IR DATA				NOAA-3	(CONF 02)						
47	221422Z	18.6N 123.7E	P	2 2 700 180 60 90				28 - -	983 293 13 11	-	-	-	-	4	
48	221620Z	19.4N 124.0E	SAT	(IR DATA				PCN 5 UMSF							
49	221620Z	19.2N 124.2E	SAT	(IR DATA				PCN 5 UMSF							
50	221620Z	19.2N 123.9E	SAT	(IR DATA				PCN 3 UMSF							
51	222246Z	19.4N 122.9E	SAT	(14.0/4.0+ /D2.0/24HMS)				PCN 3 UMSF							
52	222246Z	19.2N 122.7E	SAT	(14.5/4.5 /D1.0/19HMS)				PCN 3 UMSF							
53	222347Z	19.3N 122.0E	SAT	(14.5/4.5 /D0.5/24HMS)				PCN 3 UMSF							
54	222347Z	19.3N 122.5E	SAT	(IR DATA				PCN 3 UMSF							
55	230109Z	19.0N 122.0E	SAT	(14.5/4.5 /D0.5/24HMS)				NOAA-3	(CONF 01)						
56	230230Z	19.4N 121.7E	P	2 700 110 65 60				40 75 60 35	971 286 10 13	CTMC	-	-	20	5	
57	230320Z	19.3N 121.8E	SAT	(IR DATA				PCN 3 UMSF							
58	230320Z	19.2N 121.9E	SAT	(IR DATA				PCN 3 UMSF							
59	230400Z	19.4N 121.7E	LHUM	- CIRCULAR EYE, OPEN NE, 11 NM DIAM										18.1N 120.5E	
60	230505Z	19.3N 121.5E	LHUM	- CIRCULAR EYE, OPEN SE, 15 NM DIAM, 90 PERCENT WALL CLOUD										18.1N 120.5E	
61	230530Z	19.1N 121.6E	P	1 2 700 40 70 20				22 75 270 40	971 284 10 11	CTMC	-	-	25	5	
62	230600Z	19.2N 121.4E	LHUM	- CIRCULAR EYE, 18 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
63	230700Z	19.2N 121.2E	LHUM	- CIRCULAR EYE, 22 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
64	230800Z	19.2N 121.0E	LHUM	- CIRCULAR EYE, 15 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
65	230830Z	19.2N 121.3E	P	2 700 340 65 200				50 85 290 60	972 283 17 13	CTMC	-	-	12	5	
66	230900Z	19.2N 121.2E	LHUM	- CIRCULAR OPEN EYE, 15 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
67	231000Z	19.2N 121.1E	LHUM	- CIRCULAR EYE, 07 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
68	231100Z	19.2N 121.0E	LHUM	- CIRCULAR EYE, 15 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
69	231129Z	18.7N 120.9E	SAT	(IR DATA				PCN 2 UMSF							
70	231129Z	19.3N 121.1E	SAT	(IR DATA				PCN 2 UMSF							
71	231200Z	19.3N 120.1E	LHUM	- CIRCULAR EYE, 13 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
72	231201Z	20.0N 120.7E	SAT	(IR DATA				NOAA-3	(CONF 01)						
73	231228Z	19.2N 120.7E	SAT	(IR DATA				PCN 2 UMSF							
74	231228Z	19.0N 120.6E	SAT	(IR DATA				PCN 1 UMSF							
75	231400Z	19.0N 120.9E	LHUM	- CIRCULAR EYE, 15 NM DIAM, 100 PERCENT WALL CLOUD										18.1N 120.5E	
76	231400Z	18.3N 120.8E	LHUM	- CIRCULAR EYE, 10 NM DIAM, 100 PERCENT WALL CLOUD										16.6N 120.3E	
77	231433Z	18.8N 120.7E	P	1 700 - -				- - -	972 285 14 9	CTMC	-	-	20	5	
78	231530Z	18.3N 120.5E	LHUM	- CIRCULAR EYE, 30 NM DIAM, 100 PERCENT WALL CLOUD										18.6N 120.3E	
79	231601Z	18.8N 120.7E	SAT	(IR DATA				PCN 1 UMSF							
80	231601Z	18.8N 120.6E	SAT	(IR DATA				PCN 1 UMSF							
81	231630Z	18.3N 120.3E	LHUM	- CIRCULAR EYE, 20 NM DIAM, 100 PERCENT WALL CLOUD										18.6N 120.3E	
82	231730Z	16.5N 120.2E	LHUM	- CIRCULAR EYE, 20 NM DIAM, 100 PERCENT WALL CLOUD										18.6N 120.3E	
83	231830Z	18.2N 120.3E	LHUM	- CIRCULAR EYE, 25 NM DIAM, 100 PERCENT WALL CLOUD										18.6N 120.3E	
84	232101Z	18.3N 120.0E	P	2 700 100 70 20				19 - -	967 281 14 7	CTMC	-	-	20	5	
85	232125Z	18.3N 120.0E	LHUM	- CIRCULAR EYE, 17 NM DIAM, 100 PERCENT WALL CLOUD										18.6N 120.3E	
86	232231Z	18.3N 119.6E	SAT	(14.5/4.5 /S /24HMS)				PCN 1 UMSF							

TYPHOON DELLA  
FIX POSITIONS FOR CYCLONE NO. 29  
0000Z 21 OCT TO 0000Z 27 OCT

FIX NO.	TIME	POSIT	FIX CAT	ACQRY NAV-MET	FIX LVL	DIR	VEL	MAX OBS BKG RNG	MAX OBS SFC WIND VEL	MAX OBS SURF WIND RNG	MIN SLP	MIN MGT	FLT TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT UP HAUAR	MSN NMEN
87	232328Z	18.3N 119.5E	SAT	(IR DATA)					PCN 1 UMSP									
88	240024Z	18.0N 119.2E	SAT	(15.0/5.0 / 00.5/23HMS)					NUAA-3	(CONF 02)								
89	240110Z	18.1N 119.7E	SAT	(10.0/6.0 / 02.0/27HMS)					PCN 1 UMSP									
90	240110Z	18.1N 119.7E	SAT	(15.0/5.0 / / HMS)					PCN 1 UMSP									
91	240301Z	18.0N 119.3E	SAT	(15.0/5.0 / 00.5/27HMS)					PCN 1 UMSP									
92	240301Z	18.0N 119.4E	SAT	(IR DATA)					PCN 1 UMSP									
93	240700Z	17.9N 119.1E	LHUM	- CIRCULAR EYE OPEN N, 13 NM DIAM, 60 PERCENT WALL CLOUD													16.6N 120.3E	
94	240800Z	18.1N 118.9E	LHUM	- CIRCULAR EYE OPEN N, 18 NM DIAM, 60 PERCENT WALL CLOUD													16.6N 120.3E	
95	240830Z	18.1N 118.7E	P	3 700 140 75 70 30 70 25 907 283 10 14														7
96	240900Z	17.9N 118.8E	LHUM	- CIRCULAR EYE OPEN N, 18 NM DIAM, 60 PERCENT WALL CLOUD													16.6N 120.3E	
97	241000Z	17.9N 118.5E	LHUM	- CIRCULAR EYE, 25 NM DIAM, 60 PERCENT WALL CLOUD													16.6N 120.3E	
98	241100Z	17.9N 118.4E	LHUM	- CIRCULAR EYE, 25 NM DIAM, 60 PERCENT WALL CLOUD													16.6N 120.3E	
99	241113Z	17.9N 118.1E	SAT	(IR DATA)					PCN 3 UMSP									
100	241114Z	18.0N 118.2E	SAT	(IR DATA)					PCN 3 UMSP									
101	241200Z	17.9N 118.1E	LHUM	- CIRCULAR EYE OPEN N, 23 NM DIAM, 60 PERCENT WALL CLOUD													16.6N 120.3E	
102	241300Z	17.8N 118.0E	LHUM	- CIRCULAR EYE OPEN N, 23 NM DIAM, 60 PERCENT WALL CLOUD													16.6N 120.3E	
103	241351Z	17.8N 117.8E	SAT	(IR DATA)					PCN 1 UMSP									
104	241430Z	17.9N 117.6E	P	3 4 700 90 85 240 17 - - 967 281 17 11														7
105	241543Z	18.1N 117.4E	SAT	(IR DATA)					PCN 3 UMSP									
106	241543Z	17.9N 117.3E	SAT	(IR DATA)					PCN 1 UMSP									
107	242215Z	17.9N 116.3E	SAT	(15.0/5.0 / 00.5/24HMS)					PCN 1 UMSP									
108	250051Z	18.0N 115.7E	SAT	(10.0/6.0 / 5 / 24HMS)					PCN 1 UMSP									
109	250052Z	18.1N 115.7E	SAT	(15.0/5.0 / 5 / 24HMS)					PCN 1 UMSP									
110	250134Z	17.8N 115.0E	SAT	(15.0/5.0 / 5 / 25HMS)					NUAA-3	(CONF 01)								
111	250424Z	18.0N 115.1E	SAT	(IR DATA)					PCN 1 UMSP									
112	250456Z	18.2N 114.4E	P	3 - 700 110 90 90 60 100 30 12 958 275 15 11														8
113	251058Z	18.4N 113.3E	SAT	(IR DATA)					PCN 2 UMSP									
114	251058Z	18.4N 113.3E	SAT	(IR DATA)					PCN 1 UMSP									
115	251058Z	18.3N 113.3E	SAT	(IR DATA)					PCN 1 UMSP									
116	251333Z	18.3N 113.0E	SAT	(IR DATA)					PCN 1 UMSP									
117	251706Z	18.6N 112.3E	SAT	(IR DATA)					PCN 1 UMSP									
118	252341Z	18.9N 111.4E	SAT	(10.0/6.0 / 5 / 24HMS)					PCN 2 UMSP									
119	260033Z	19.0N 110.5E	SAT	(15.0/5.0 / 5 / 24HMS)					PCN 1 UMSP									
120	260045Z	19.2N 109.7E	SAT	(IR DATA)					PCN 5 UMSP									
121	261225Z	19.6N 108.3E	SAT	(IR DATA)					PCN 4 UMSP									
122	261226Z	19.5N 113.1E	SAT	(IR DATA)					NUAA-3	(CONF 01)								
123	261315Z	20.1N 108.1E	SAT	(IR DATA)					PCN 1 UMSP									
124	261336Z	20.5N 107.0E	SAT	(IR DATA)					NUAA-3	(CONF 01)								
125	261647Z	19.5N 107.3E	SAT	(IR DATA)					PCN 3 UMSP									
126	262326Z	19.6N 106.1E	SAT	(IR DATA)					PCN 5 UMSP									

TYPHOON ELAINE  
FIX POSITIONS FOR CYCLONE NO. 30  
0600Z 24 OCT TO 0600Z 31 OCT

FIX NO.	TIME	POSIT	FIX CAT	ACQRY NAV-MET	FIX LVL	DIR	VEL	MAX OBS BKG RNG	MAX OBS SFC WIND VEL	MAX OBS SURF WIND RNG	MIN SLP	MIN MGT	FLT TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT UP HAUAR	MSN NMEN
1	212223Z	11.2N 147.5E	SAT	(11.0/1.0 / / HMS)					PCN 5 UMSP									
2	220157Z	12.1N 147.5E	SAT	(IR DATA)					PCN 5 UMSP									
3	221004Z	13.8N 148.3E	SAT	(IR DATA)					PCN 6 UMSP									
4	221105Z	14.2N 147.7E	SAT	(IR DATA)					PCN 6 UMSP									
5	221438Z	14.5N 147.6E	SAT	(IR DATA)					PCN 6 UMSP									
6	222205Z	15.0N 146.9E	SAT	(11.5/1.5 / 00.5/24HMS)					PCN 5 UMSP									
7	222205Z	15.1N 146.8E	SAT	(11.0/1.0 / / HMS)					PCN 5 UMSP									
8	222315Z	15.1N 146.1E	SAT	(11.5/1.5 / 00.5/24HMS)					NUAA-3	(CONF 02)								
9	230138Z	15.8N 146.1E	SAT	(IR DATA)					PCN 5 UMSP									
10	230947Z	16.4N 144.6E	SAT	(IR DATA)					PCN 6 UMSP									
11	231420Z	17.0N 143.3E	SAT	(IR DATA)					PCN 6 UMSP									
12	231420Z	17.4N 142.9E	SAT	(IR DATA)					PCN 6 UMSP									
13	232049Z	17.3N 141.8E	SAT	(12.0/2.0 / 00.5/23HMS)					PCN 3 UMSP									
14	232328Z	17.3N 141.3E	SAT	(IR DATA)					PCN 5 UMSP									
15	232328Z	16.6N 141.5E	SAT	(12.0/2.0 / 01.0/23HMS)					PCN 5 UMSP									
16	232328Z	16.8N 141.7E	SAT	(11.5/1.5 / / HMS)					PCN 5 UMSP									
17	240301Z	17.6N 141.1E	SAT	(IR DATA)					PCN 5 UMSP									
18	240301Z	17.9N 140.0E	SAT	(IR DATA)					PCN 5 UMSP									
19	240558Z	17.9N 140.2E	P	5 2 700 340 25 250 30 30 240 40 - - 308 13 12														1
20	240558Z	18.1N 140.0E	P	5 2 700 340 20 50 20 35 40 40 999 308 13 12														1
21	240932Z	17.9N 139.8E	SAT	(IR DATA)					PCN 5 UMSP									
22	241210Z	18.1N 139.7E	SAT	(IR DATA)					PCN 5 UMSP									
23	241210Z	18.7N 139.5E	SAT	(IR DATA)					PCN 5 UMSP									
24	241230Z	17.6N 139.7E	P	5 2 700 360 25 280 40 - - 1001 308 14 12														1
25	241543Z	18.5N 139.0E	SAT	(IR DATA)					PCN 5 UMSP									
26	241543Z	18.5N 138.4E	SAT	(IR DATA)					PCN 5 UMSP									
27	242215Z	18.5N 137.9E	SAT	(IR DATA)					PCN 5 UMSP									
28	242310Z	18.1N 137.5E	SAT	(13.0/3.0 / 01.0/23HMS)					PCN 3 UMSP									
29	242310Z	17.7N 137.9E	SAT	(12.5/2.5 / 00.5/24HMS)					PCN 5 UMSP									
30	242310Z	18.3N 137.7E	SAT	(12.0/2.0 / 00.5/24HMS)					PCN 5 UMSP									
31	242338Z	17.5N 138.1E	SAT	(13.0/3.0 / 01.0/23HMS)					NUAA-3	(CONF 01)								
32	250242Z	17.6N 137.1E	SAT	(IR DATA)					PCN 5 UMSP									
33	250242Z	16.9N 137.4E	SAT	(IR DATA)					PCN 5 UMSP									
34	250908Z	17.3N 135.9E	P	10 10 700 120 30 150 90 35 150 120 999 302 12 12														3
35	251029Z	17.0N 133.9E	SAT	(IR DATA)					NUAA-3	(CONF 01)								
36	251058Z	17.4N 135.9E	SAT	(IR DATA)					PCN 5 UMSP									
37	251058Z	17.9N 135.6E	SAT	(IR DATA)					PCN 3 UMSP									
38	251058Z	17.6N 135.7E	SAT	(IR DATA)					PCN 6 UMSP									
39	251151Z	17.6N 135.5E	SAT	(IR DATA)					PCN 3 UMSP									
40	251151Z	17.9N 135.4E	SAT	(IR DATA)					PCN 3 UMSP									
41	251524Z	17.4N 134.7E	SAT	(IR DATA)					PCN 5 UMSP									
42	251525Z	17.5N 134.6E	SAT	(IR DATA)					PCN 3 UMSP									
43	252123Z	17.0N 133.8E	P	5 10 700 90 70 340 55 60 340 55 983 295 15 12														4
44	252200Z	17.0N 133.0E	SAT	(IR DATA)					PCN 3 UMSP									
45	252251Z	17.1N 134.0E	SAT	(IR DATA)					PCN 3 UMSP									
46	252252Z	17.3N 134.2E	SAT	(13.5/3.5 / 01.0/24HMS)					PCN 3 UMSP									
47	260224Z	16.8N 132.1E	SAT	(14.5/4.5 / 01.5/24HMS)					PCN 3 UMSP									
48	260224Z	16.9N 132.1E	SAT	(IR DATA)					PCN 1 UMSP									
49	260920Z	16.6N 130.8E	P	3 2 700 320 80 240 50 60 240 70 989 283 15 15														5
50	261043Z	16.8N 130.5E	SAT	(IR DATA)					PCN 2 UMSP									

TYPHOON ELAINE  
FIX POSITIONS FOR CYCLONE NO. 30  
0600Z 24 OCT TO 0600Z 31 OCT

FIA NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VLL BRK RRG	MAX OBS SFC WIND VLL BRK RRG	UWS MIN SLP	MIN /100MB HGT	FLT LVL T1/T0	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMHM
51	201043Z	16.8N 130.4E	SAT	(IK DATA			PCN 1 DMSP								
52	201143Z	17.0N 130.3E	SAT	(IK DATA			PCN 1 DMSP								
53	201143Z	16.9N 130.4E	SAT	(IK DATA			PCN 1 DMSP								
54	201140Z	16.0N 130.0E	SAT	(IK DATA			PCN 1 DMSP								
55	201140Z	16.7N 129.4E	P	3 10	700	190 85 120	NOAA-3	(CONF 01)							
56	201505Z	17.1N 129.1E	SAT	(IK DATA			PCN 1 DMSP		966	279	10 12	ELTP	N-S	40X15	5
57	201505Z	17.0N 130.1E	SAT	(IK DATA			PCN 1 DMSP								
58	202144Z	17.0N 127.7E	SAT	(IK DATA			PCN 1 DMSP								
59	270015Z	16.9N 127.3E	SAT	(15.0/5.0 /00.5/24HMS)			PCN 1 DMSP								
60	270015Z	16.0N 127.2E	SAT	(15.0/5.0 /5 /24HMS)			PCN 1 DMSP								
61	270345Z	16.7N 126.9E	SAT	(15.0/5.5 / /HMS)			PCN 1 DMSP								
62	270346Z	17.0N 126.7E	SAT	(IK DATA			PCN 1 DMSP								
63	270347Z	16.8N 126.7E	SAT	(16.0/6.0 / /HMS)			PCN 1 DMSP								
64	270400Z	16.8N 126.6E	P	3 3 700	190 90 100	25 70 160	40 947	265	17 11						6
65	270830Z	17.0N 125.5E	P	3 3 700	30 110 300	30 80 300	30	259	19 13	CTRC			35		6
66	271027Z	17.0N 124.9E	SAT	(IK DATA			PCN 2 DMSP								
67	271027Z	17.0N 124.9E	SAT	(IK DATA			PCN 1 DMSP								
68	271249Z	18.5N 124.0E	SAT	(IK DATA			NOAA-3	(CONF 01)							
69	271256Z	17.1N 124.4E	SAT	(IK DATA			PCN 1 DMSP								
70	271256Z	17.4N 124.4E	SAT	(IK DATA			PCN 1 DMSP								
71	271430Z	17.3N 123.7E	P	2 2 700	330 95 240	60	943	258	20 13	CTRC			35		7
72	271626Z	17.3N 123.1E	SAT	(IK DATA			PCN 1 DMSP								
73	272311Z	17.3N 122.4E	SAT	(IK DATA			PCN 2 DMSP								
74	272357Z	17.0N 121.7E	SAT	(14.5/5.0+/W0.5/24HMS)			PCN 1 DMSP								
75	272357Z	17.0N 121.5E	SAT	(15.0/5.0 /S /24HMS)			PCN 1 DMSP								
76	280113Z	16.8N 120.8E	SAT	(15.0/5.5 /W0.5/25HMS)			NOAA-3	(CONF 01)							
77	280328Z	17.6N 120.9E	SAT	(IK DATA			PCN 3 DMSP								
78	280328Z	17.7N 120.6E	SAT	(IK DATA			PCN 3 DMSP								
79	280440Z	17.8N 119.8E	P	3 5 700	100 70 30	70 45 30	60 967	282	15 11	CTRC			40		8
80	281154Z	17.9N 118.8E	SAT	(IK DATA			PCN 4 DMSP								
81	281204Z	18.6N 119.4E	SAT	(IK DATA			NOAA-3	(CONF 01)							
82	281238Z	18.1N 118.7E	SAT	(IK DATA			PCN 3 DMSP								
83	281238Z	18.3N 118.6E	SAT	(IK DATA			PCN 3 DMSP								
84	281430Z	17.9N 118.6E	P	3 5 700	50 90 330	100	284	14 10	CTRC				40		9
85	281810Z	17.9N 118.4E	SAT	(IK DATA			PCN 3 DMSP								
86	281810Z	18.0N 118.5E	SAT	(IK DATA			PCN 3 DMSP								
87	281810Z	18.0N 118.5E	SAT	(IK DATA			PCN 3 DMSP								
88	281810Z	18.0N 118.4E	SAT	(IK DATA			PCN 4 DMSP								
89	282255Z	18.2N 117.0E	SAT	(14.5/5.5+/W1.5/42HMS)			PCN 3 DMSP								
90	290027Z	18.7N 116.4E	SAT	(14.0/5.0 /W1.0/24HMS)			NOAA-3	(CONF 02)							
91	290120Z	19.1N 115.3E	SAT	(14.0/6.0 / /HMS)			PCN 5 DMSP								
92	290120Z	18.1N 116.9E	SAT	(15.5/5.5 / /HMS)			PCN 1 DMSP								
93	290310Z	18.9N 117.1E	SAT	(14.5/4.5 /S /27HMS)			PCN 1 DMSP								
94	290310Z	18.9N 117.3E	SAT	(15.0/5.0+/S /27HMS)			PCN 1 DMSP								
95	290935Z	19.4N 116.0E	P	10 5 700	200 60 110	100 40 120	120 977	290	13 10						9
96	291138Z	19.2N 115.2E	SAT	(IK DATA			PCN 6 DMSP								
97	291200Z	20.1N 115.5E	LKHM	- / / / /											
98	291315Z	19.2N 114.2E	SAT	(IK DATA			NOAA-3	(CONF 01)						22.3N 114.2E	
99	291401Z	20.4N 115.1E	SAT	(IK DATA			PCN 6 DMSP								
100	291500Z	20.2N 115.2E	LKHM	- / / / /											
101	291551Z	20.9N 114.9E	SAT	(IK DATA			PCN 5 DMSP							22.3N 114.2E	
102	291551Z	21.5N 115.0E	SAT	(IK DATA			PCN 4 DMSP								
103	292110Z	20.6N 114.3E	LKHM	- 30 / / /										22.3N 114.2E	
104	292240Z	21.2N 114.1E	SAT	(13.0/4.5-/W1.5/24HMS)			PCN 5 DMSP								
105	292240Z	21.2N 113.3E	SAT	(14.5/4.5-/S /24HMS)			PCN 5 DMSP								
106	292300Z	20.7N 114.2E	LKHM	- 20 / / /										22.3N 114.2E	
107	300000Z	20.8N 114.1E	LKHM	- 2591 /										22.3N 114.2E	
108	300100Z	20.9N 114.0E	LKHM	- 2591 /										22.3N 114.2E	
109	300102Z	20.8N 113.6E	SAT	(13.0/4.0-/W1.0/24HMS)			PCN 3 DMSP							22.3N 114.2E	
110	300102Z	20.9N 113.6E	SAT	(IK DATA			PCN 5 DMSP								
111	300137Z	20.8N 113.0E	SAT	(13.0/4.0 /W1.0/24HMS)			NOAA-3	(CONF 02)							
112	300300Z	21.0N 113.9E	LKHM	- 254 / /										22.3N 114.2E	
113	300400Z	21.0N 113.8E	LKHM	- 2591 /										22.3N 114.2E	
114	300432Z	21.1N 113.8E	SAT	(IK DATA			PCN 5 DMSP								
115	300520Z	20.7N 113.8E	LKHM	- 55 / / /										22.3N 114.2E	
116	300600Z	20.9N 113.8E	LKHM	- 55 / / /										22.3N 114.2E	
117	300700Z	20.9N 113.8E	LKHM	- / / / /										22.3N 114.2E	
118	301123Z	21.0N 113.3E	SAT	(IK DATA			PCN 6 DMSP								
119	301123Z	21.2N 113.6E	SAT	(IK DATA			PCN 6 DMSP								
120	301200Z	21.0N 113.5E	LKHM	- 3002 /											
121	301343Z	21.3N 113.2E	SAT	(IK DATA			PCN 3 DMSP							22.3N 114.2E	
122	301450Z	20.8N 113.5E	LKHM	- 2061 /										22.3N 114.2E	
123	301714Z	21.0N 113.7E	SAT	(IK DATA			PCN 6 DMSP							22.3N 114.2E	
124	302100Z	20.9N 113.3E	LKHM	- 20 / / /										22.3N 114.2E	
125	302224Z	21.9N 113.0E	SAT	(11.5/2.5-/W1.5/24HMS)			PCN 5 DMSP							22.3N 114.2E	
126	310000Z	20.8N 113.0E	LKHM	- 20 / / /										22.3N 114.2E	
127	310043Z	20.7N 113.0E	SAT	(12.0/3.0 /W1.0/24HMS)			PCN 3 DMSP							22.3N 114.2E	
128	310043Z	20.8N 112.0E	SAT	(12.5/3.5-/W2.0/24HMS)			PCN 5 DMSP								
129	310300Z	20.7N 112.7E	LKHM	- 152 / /										22.3N 114.2E	
130	310414Z	20.3N 112.7E	SAT	(IK DATA			PCN 3 DMSP								
131	010025Z	17.8N 110.2E	SAT	(11.5/1.5 /S /20HMS)			PCN 3 DMSP								
132	010355Z	17.3N 109.8E	SAT	(IK DATA			PCN 3 DMSP								



TROPICAL STORM FAYE  
FIX POSITIONS FOR CYCLONE NO. 31  
3600Z 01 NOV TO 0600Z 04 NOV

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	DIR	FLT LVL	MAX OBS WIND	MAX OBS SFC WIND	UWS MIN SLP	MIN MGT	FLT LVL	EYE FORM	ORIENT- IATION	EYE DIA	POSIT OF RADAR	MSN NMHM
1	302224Z	11.4N 129.4E	SAT	(11.5/1.5 / / HNS)				PCN 5 DMSP									
2	310232Z	11.8N 128.8E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
3	310232Z	11.5N 128.7E	SAT	(12.0/2.0 / / HNS)				PCN 5 DMSP									
4	311107Z	12.1N 126.4E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
5	311514Z	12.5N 125.0E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
6	312209Z	13.1N 124.5E	SAT	(11.5/1.5 / 5 / 24HNS)				PCN 3 DMSP									
7	010008Z	12.8N 124.0E	SAT	(12.0/2.0 / 00.5/23HNS)				NOAA-3									
8	010025Z	13.2N 124.1E	SAT	(11.8 DATA / / HNS)				PCN 3 DMSP									
9	010025Z	13.0N 123.9E	SAT	(12.0/2.0 / / HNS)				PCN 5 DMSP									
10	010355Z	13.5N 123.0E	SAT	(11.5/1.5 / / HNS)				PCN 5 DMSP									
11	011052Z	12.9N 122.5E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
12	011252Z	13.8N 122.3E	SAT	(11.8 DATA / / HNS)				NOAA-3									
13	011637Z	13.6N 119.9E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
14	020007Z	13.9N 119.4E	SAT	(12.5/2.5 / 01.0/26HNS)				PCN 5 DMSP									
15	020007Z	13.8N 118.5E	SAT	(13.0/3.0 / 01.0/24HNS)				PCN 5 DMSP									
16	020336Z	13.5N 119.0E	SAT	(13.0/3.5 / / HNS)				PCN 3 DMSP									
17	020337Z	13.9N 118.9E	SAT	(12.5/2.5 / 01.0/24HNS)				PCN 5 DMSP									
18	020337Z	14.0N 119.0E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
19	021037Z	14.5N 116.7E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
20	021040Z	14.4N 116.9E	P	5 5 700 160 20 120				40 - -	490	294	15	13	-	-	-		1
21	021207Z	14.3N 116.1E	SAT	(11.8 DATA / / HNS)				NOAA-3									
22	021218Z	14.5N 116.5E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
23	021248Z	14.4N 116.5E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
24	021430Z	14.2N 116.2E	P	5 5 700 100 55 360				100 - -	987	298	14	12	CTMC		20		1
25	021618Z	14.5N 116.2E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
26	022320Z	14.8N 114.4E	SAT	(13.5/3.5 / 01.0/26HNS)				PCN 5 DMSP									
27	030022Z	14.8N 113.0E	SAT	(13.5/3.5 / 00.5/23HNS)				NOAA-3									
28	030130Z	14.9N 114.2E	SAT	(14.0/4.0 / 01.0/25HNS)				PCN 3 DMSP									
29	030317Z	14.9N 112.2E	SAT	(11.8 DATA / / HNS)				NOAA-3									
30	030318Z	15.0N 113.6E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
31	030318Z	15.0N 113.2E	SAT	(13.5/3.5 / 01.0/27HNS)				PCN 3 DMSP									
32	031203Z	15.2N 112.4E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
33	031600Z	15.5N 111.3E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
34	032304Z	14.0N 109.9E	SAT	(11.5/2.5 / 02.0/24HNS)				PCN 5 DMSP									
35	040112Z	15.9N 109.1E	SAT	(13.0/4.0 / 01.0/24HNS)				PCN 5 DMSP									
36	040441Z	14.6N 109.1E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
37	041148Z	14.7N 106.8E	SAT	(11.8 DATA / / HNS)				PCN 3 DMSP									

TYPHOON GLORIA  
FIX POSITIONS FOR CYCLONE NO. 32  
0000Z 03 NOV TO 1200Z 09 NOV

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	DIR	FLT LVL	MAX OBS WIND	MAX OBS SFC WIND	UWS MIN SLP	MIN MGT	FLT LVL	EYE FORM	ORIENT- IATION	EYE DIA	POSIT OF RADAR	MSN NMHM
1	292320Z	7.5N 148.9E	SAT	(11.0/1.0 / / HNS)				PCN 5 DMSP									
2	010910Z	5.9N 142.1E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
3	011215Z	6.4N 142.1E	SAT	(12.0/2.0 / 01.0/22HNS)				PCN 5 DMSP									
4	012225Z	6.5N 142.0E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
5	012324Z	5.5N 141.2E	SAT	(12.0/2.0 / 01.0/24HNS)				NOAA-3									
6	020155Z	6.4N 141.4E	SAT	(11.8 DATA / / HNS)				PCN 3 DMSP									
7	020855Z	5.7N 141.8E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
8	021106Z	6.3N 141.8E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
9	021437Z	6.4N 141.8E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
10	022138Z	7.0N 140.9E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
11	022739Z	7.0N 141.0E	SAT	(12.5/2.5 / 00.5/23HNS)				NOAA-3									
12	022348Z	7.8N 141.0E	SAT	(12.5/2.5 / / HNS)				PCN 5 DMSP									
13	022348Z	7.8N 140.6E	SAT	(12.5/2.5 / 00.5/23HNS)				PCN 5 DMSP									
14	030045Z	7.4N 141.3E	P	5 5 700 40 35 280				75 40 330	40	490	301	17	11	-	-	-	1
15	030318Z	7.6N 140.7E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
16	030345Z	7.6N 140.9E	P	5 5 700 180 54 90				21 65 90	20	986	299	17	12	-	-	-	1
17	031021Z	7.7N 140.0E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
18	031118Z	7.7N 139.4E	SAT	(11.8 DATA / / HNS)				NOAA-3									
19	031418Z	7.8N 139.3E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
20	032123Z	4.9N 138.3E	SAT	(11.8 DATA / / HNS)				PCN 3 DMSP									
21	032324Z	10.0N 138.0E	SAT	(14.0/4.0 / 01.5/25HNS)				NOAA-3									
22	032330Z	4.9N 137.8E	SAT	(13.5/3.5 / 01.0/24HNS)				PCN 5 DMSP									
23	032330Z	4.9N 138.2E	SAT	(14.0/4.0 / 01.5/24HNS)				PCN 5 DMSP									
24	040300Z	11.2N 137.1E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
25	040910Z	12.8N 136.2E	P	5 5 700 170 90 70				10 75 100	100	976	290	14	12	-	-	-	5
26	041006Z	12.9N 136.0E	SAT	(11.8 DATA / / HNS)				PCN 4 DMSP									
27	041211Z	13.4N 135.7E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
28	041452Z	14.1N 134.3E	P	5 3 700 170 80 60				40 - -	967	282	15	-	CTMC		7		5
29	041541Z	14.6N 134.5E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
30	042107Z	15.2N 132.7E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
31	042244Z	15.3N 132.6E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
32	042312Z	15.6N 131.5E	SAT	(15.0/5.0 / 01.5/24HNS)				PCN 1 DMSP									
33	042312Z	15.5N 131.5E	SAT	(15.0/5.0 / 01.0/24HNS)				PCN 1 DMSP									
34	050058Z	15.4N 131.0E	SAT	(14.0/4.0 / 5 / 24HNS)				NOAA-3									
35	050412Z	15.8N 130.7E	SAT	(11.8 DATA / / HNS)				PCN 1 DMSP									
36	050533Z	15.8N 130.7E	P	5 2 700 180 120 90				10 130 270	3	937	257	18	15	CTMC		4	0
37	050644Z	16.0N 129.3E	P	5 2 700 - - -				- 110 180	10	949	266	21	-	CTMC		3	0
38	050950Z	16.1N 128.4E	SAT	(11.8 DATA / / HNS)				PCN 3 DMSP									
39	051132Z	16.0N 128.5E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
40	051145Z	16.0N 129.0E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
41	051153Z	16.3N 128.8E	SAT	(11.8 DATA / / HNS)				NOAA-3									
42	051523Z	16.3N 127.7E	SAT	(11.8 DATA / / HNS)				PCN 5 DMSP									
43	051535Z	15.8N 127.9E	P	10 2 700 130 75 40				15 - -	955	270	17	15	CTMC		20		7
44	052030Z	15.7N 127.0E	P	10 2 700 120 85 30				15 - -	954	272	18	14	CTMC		20		7
45	052234Z	15.7N 126.9E	SAT	(15.5/5.5 / 00.5/23HNS)				PCN 1 DMSP									
46	060010Z	16.1N 126.0E	SAT	(14.5/4.5 / 00.5/24HNS)				NOAA-3									
47	060035Z	15.9N 126.7E	SAT	(15.5/5.5 / 00.5/24HNS)				PCN 1 DMSP									
48	060222Z	16.1N 126.6E	SAT	(11.8 DATA / / HNS)				PCN 1 DMSP									
49	060404Z	16.3N 126.6E	SAT	(16.0/6.0 / / HNS)				PCN 1 DMSP									
50	060450Z	16.3N 126.2E	P	5 3 700 110 100 20				15 130 60	15	936	255	18	12	CTMC		20	0

TYPHOON GLORIA  
FIX POSITIONS FOR CYCLONE NO. 32  
0000Z 03 NOV TO 1200Z 09 NOV

FIA NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT DIR	MAX OBS LVL VEL	MAX OBS WIND BRG	MAX OBS SFC WIND VEL	MAX OBS WIND BRG	OBS MIN SLP	MIN /100MB MGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMHM	
51	060916Z	17.0N 125.2E	P	5 5	100	130	120	60	15	140	60	15	931	250	20	10	CIRC	20	8
52	061117Z	17.1N 124.7E	SAT	(1K DATA)						PCN 1 DMSP									
53	061316Z	17.2N 124.3E	SAT	(1K DATA)						PCN 1 DMSP									
54	061504Z	17.2N 123.7E	SAT	(1K DATA)						PCN 1 DMSP									
55	061606Z	17.1N 124.0E	SAT	(1K DATA)						PCN 3 DMSP									
56	062216Z	17.0N 122.0E	SAT	(1K DATA)						PCN 1 DMSP									
57	070017Z	18.0N 121.4E	SAT	(14.0/5.0 /W1.5/24HMS)						PCN 3 DMSP									
58	070017Z	18.1N 121.2E	SAT	(14.0/5.0 /W1.5/20HMS)						PCN 3 DMSP									
59	070120Z	18.0N 121.0E	SAT	(16.0/6.0 /D1.5/25HMS)						NOAA-3			(CONF 02)						
60	070144Z	17.9N 120.9E	LRUM	- 80 PERCENT WALL CLOUD, ELLIPTICAL EYE N/S													16.6N 120.3E		
61	070230Z	17.9N 120.5E	LRUM	- 80 PERCENT WALL CLOUD, ELLIPTICAL EYE N/S													16.6N 120.3E		
62	070320Z	18.0N 120.5E	LRUM	-													16.6N 120.3E		
63	070345Z	18.2N 120.4E	SAT	(16.0/6.0 /S /24HMS)						PCN 3 DMSP							16.6N 120.3E		
64	070345Z	18.2N 120.6E	SAT	(1K DATA)						PCN 3 DMSP									
65	070345Z	17.9N 120.4E	LRUM	-													16.6N 120.3E		
66	070400Z	18.0N 120.3E	LRUM	-													16.6N 120.3E		
67	070430Z	18.0N 120.1E	LRUM	-													16.6N 120.3E		
68	070500Z	18.0N 120.0E	LRUM	- ECHOES DISORGANIZED													16.6N 120.3E		
69	070630Z	18.0N 119.5E	LRUM	- 75 PERCENT WALL CLOUD, CIRCULAR EYE													16.6N 120.3E		
70	070900Z	18.2N 119.2E	LRUM	-													16.6N 120.3E		
71	071101Z	18.7N 119.5E	SAT	(1K DATA)						PCN 3 DMSP									
72	071101Z	18.7N 119.3E	SAT	(1K DATA)						PCN 3 DMSP									
73	071211Z	19.4N 119.5E	SAT	(1K DATA)						NOAA-3			(CONF 01)						
74	071258Z	19.6N 119.1E	SAT	(1K DATA)						PCN 3 DMSP									
75	071307Z	19.5N 118.1E	SAT	(1K DATA)						PCN 3 DMSP									
76	072344Z	19.0N 118.3E	SAT	(1K DATA)						PCN 6 DMSP									
77	072358Z	20.1N 117.7E	SAT	(14.0/4.0 /S /24HMS)						PCN 3 DMSP									
78	072358Z	19.6N 118.0E	SAT	(14.0/4.0 /S /24HMS)						PCN 3 DMSP									
79	080033Z	19.8N 117.9E	SAT	(14.5/5.5 /W1.5/24HMS)						NOAA-3			(CONF 01)						
80	080130Z	20.0N 117.8E	P	10 10	700	140	35	50	30	45	250	20	986	298	15	13	-	10	
81	080327Z	20.2N 117.5E	SAT	(14.0/5.0 /W2.0/24HMS)						PCN 1 DMSP									
82	080327Z	20.5N 117.6E	SAT	(1K DATA)						PCN 1 DMSP									
83	080449Z	20.4N 117.6E	P	10 5	700	210	36	100	80	60	250	35	987	298	14	13	-	10	
84	081040Z	21.9N 117.4E	SAT	(1K DATA)						PCN 3 DMSP									
85	081228Z	21.1N 116.8E	SAT	(1K DATA)						PCN 5 DMSP									
86	081240Z	22.1N 117.2E	SAT	(1K DATA)						PCN 3 DMSP									
87	081323Z	22.2N 116.5E	SAT	(1K DATA)						NOAA-3			(CONF 01)						
88	081808Z	22.3N 116.9E	SAT	(1K DATA)						PCN 5 DMSP									
89	081809Z	22.2N 116.6E	SAT	(1K DATA)						PCN 5 DMSP									
90	082329Z	21.9N 116.9E	SAT	(1K DATA)						PCN 3 DMSP									
91	082340Z	22.4N 116.7E	SAT	(12.5/3.5 /W1.5/24HMS)						PCN 3 DMSP									
92	090010Z	22.2N 116.8E	LRUM	- 51///													22.3N 114.2E		
93	090122Z	22.4N 116.7E	SAT	(12.5/3.5 /W1.5/24HMS)						PCN 3 DMSP									
94	090143Z	22.5N 116.5E	SAT	(13.0/4.0 /W1.5/24HMS)						NOAA-3			(CONF 01)						
95	090300Z	22.3N 116.4E	LRUM	- 51///													22.3N 114.2E		
96	090308Z	22.7N 116.7E	SAT	(1K DATA)						PCN 3 DMSP									
97	090800Z	22.3N 116.4E	LRUM	- 55/// QSTNRY													22.3N 114.2E		
98	090800Z	22.1N 116.2E	LRUM	- 55///													22.3N 114.2E		
99	091212Z	22.5N 116.0E	SAT	(1K DATA)						PCN 5 DMSP									
100	091237Z	22.7N 116.0E	SAT	(1K DATA)						NOAA-3			(CONF 02)						

TROPICAL STORM HESTER  
FIX POSITIONS FOR CYCLONE NO. 33  
1200Z 14 NOV TO 1200Z 15 NOV

FIA NO.	TIME	POSIT	FIA CAT	ACCHY NAV-MET	FIA LVL	MAX OBS FLT DIR	MAX OBS LVL VEL	MAX OBS WIND BRG	MAX OBS SFC WIND VEL	MAX OBS WIND BRG	OBS MIN SLP	MIN /100MB MGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF RADAR	MSN NMHM
1	112309Z	12.5N 122.9E	SAT	(11.5/1.0 /D0.5/24HMS)						NOAA-3								
2	130008Z	14.3N 121.2E	SAT	(11.5/1.5 / /HMS)						PCN 5 DMSP								
3	130040Z	13.1N 121.6E	SAT	(12.0/1.5 /D0.5/24HMS)						NOAA-3								
4	130352Z	14.3N 121.3E	SAT	(1K DATA)						PCN 5 DMSP								
5	131112Z	14.0N 119.1E	SAT	(1K DATA)						PCN 5 DMSP								
6	131130Z	14.3N 118.0E	SAT	(1K DATA)						NOAA-3								
7	131250Z	14.1N 119.1E	SAT	(1K DATA)						PCN 5 DMSP								
8	132320Z	14.8N 117.3E	SAT	(11.5/1.5 /S /24HMS)						PCN 5 DMSP								
9	140132Z	14.0N 116.6E	SAT	(11.5/1.5 / /HMS)						PCN 5 DMSP								
10	140130Z	13.5N 116.0E	SAT	(12.5/2.5 /D0.5/24HMS)						NOAA-3								
11	140317Z	13.4N 116.2E	SAT	(1K DATA)						PCN 5 DMSP								
12	141055Z	13.4N 114.2E	SAT	(1K DATA)						PCN 5 DMSP								
13	141055Z	13.4N 114.4E	SAT	(1K DATA)						PCN 5 DMSP								
14	141238Z	13.3N 114.0E	SAT	(1K DATA)						NOAA-3								
15	141558Z	13.4N 113.7E	SAT	(1K DATA)						PCN 5 DMSP								
16	142338Z	13.2N 111.1E	SAT	(1K DATA)						PCN 3 DMSP								
17	150113Z	13.2N 110.9E	SAT	(13.5/3.5 / /HMS)						PCN 1 DMSP								
18	150113Z	13.1N 110.9E	SAT	(13.0/3.0 /D1.5/24HMS)						PCN 1 DMSP								
19	150440Z	13.0N 110.0E	SAT	(1K DATA)						PCN 1 DMSP								
20	151222Z	12.5N 107.9E	SAT	(1K DATA)						PCN 1 DMSP								

TYPHOON IRMA  
FIX POSITIONS FOR CYCLONE NO. 34  
1200Z 21 NOV TO 0600Z 02 DEC

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS DIR VEL	FLT LVL WIND BKG RNG	MAX OBS SFC WIND VEL BRG RNG	OBS MIN SLP	MIN HGT	FL1 LVL T1/T0	EYE FORM	UMIEN-TATION	EYE DIA	POSIT OF RADAR	MSN NMNM
1	162138Z	7.0N 154.9E	SAT			(12.0/2.0 /01.0/24HRS)		NOAA-3			(CONF 02)					
2	170427Z	9.1N 155.0E	SAT			(1H DATA)		PCN 6 UMSP								
3	171019Z	10.0N 155.0E	SAT			(1H DATA)		NOAA-3			(CONF 02)					
4	171321Z	9.4N 154.8E	SAT			(1H DATA)		PCN 6 UMSP								
5	172110Z	10.0N 153.7E	SAT			(11.0/1.0 / / HRS)		PCN 5 UMSP								
6	172237Z	10.1N 153.4E	SAT			(1H DATA)		PCN 5 UMSP								
7	180954Z	10.5N 152.7E	SAT			(1H DATA)		PCN 5 UMSP								
8	190938Z	9.0N 147.2E	SAT			(1H DATA)		PCN 6 UMSP								
9	192039Z	8.6N 148.0E	SAT			(11.0/1.0 / / HRS)		PCN 5 UMSP								
10	200923Z	7.7N 143.1E	SAT			(1H DATA)		PCN 6 UMSP								
11	202228Z	7.9N 141.8E	SAT			(12.5/2.5 /01.5/24HRS)		NOAA-3			(CONF 01)					
12	202323Z	8.8N 143.0E	SAT			(11.5/1.5 /00.5/24HRS)		PCN 5 UMSP								
13	210248Z	9.5N 143.3E	SAT			(1H DATA)		PCN 5 UMSP								
14	210907Z	9.6N 142.0E	SAT			(1H DATA)		PCN 6 UMSP								
15	211109Z	8.5N 139.5E	SAT			(1H DATA)		NOAA-3			(CONF 02)					
16	211205Z	9.5N 141.8E	SAT			(1H DATA)		PCN 5 UMSP								
17	211530Z	9.5N 141.5E	SAT			(1H DATA)		PCN 5 UMSP								
18	212133Z	11.2N 140.8E	P	10	3	1500	120	35	70	80	25	70				1
19	212150Z	11.5N 140.8E	SAT			(1H DATA)		PCN 5 UMSP								
20	212305Z	11.7N 140.5E	SAT			(11.5/1.5 / / HRS)		PCN 5 UMSP								
21	212305Z	11.2N 140.6E	SAT			(11.5/1.5 / / HRS)		PCN 5 UMSP								
22	212305Z	10.2N 140.0E	SAT			(11.5/1.5 / / HRS)		PCN 5 UMSP								
23	212338Z	11.0N 140.7E	SAT			(12.5/2.5 / / HRS)		NOAA-3			(CONF 02)					
24	220043Z	10.3N 140.3E	P	3	5	1500	260	38	150	18	40	150				1
25	220230Z	11.2N 140.2E	SAT			(1H DATA)		PCN 5 UMSP								
26	220304Z	10.3N 140.0E	P	5	-	1500	30	25	300	15	20	300				1
27	220933Z	11.1N 140.5E	P	10	20	700	100	30	360	40	20	360				2
28	221024Z	11.5N 140.0E	SAT			(1H DATA)		NOAA-3			(CONF 02)					
29	221147Z	11.3N 140.3E	SAT			(1H DATA)		PCN 5 UMSP								
30	221911Z	11.1N 140.2E	SAT			(1H DATA)		PCN 3 UMSP								
31	221911Z	11.8N 140.3E	SAT			(1H DATA)		PCN 5 UMSP								
32	222447Z	12.6N 139.8E	SAT			(13.0/3.0 /01.5/24HRS)		PCN 6 UMSP								
33	222502Z	12.2N 139.0E	SAT			(13.5/3.5 /01.0/24HRS)		NOAA-3			(CONF 02)					
34	230211Z	11.9N 139.3E	SAT			(13.0/3.0 /01.5/27HRS)		PCN 1 UMSP								
35	230211Z	12.0N 139.2E	SAT			(1H DATA)		PCN 1 UMSP								
36	230506Z	12.3N 139.1E	P	5	5	700	160	55	80	90	983	296	14	11		3
37	230835Z	12.7N 137.9E	P	5	5	700	110	70	20	150	65	20				-
38	231018Z	13.2N 138.5E	SAT			(1H DATA)		PCN 3 UMSP								
39	231128Z	13.9N 138.2E	SAT			(1H DATA)		PCN 3 UMSP								
40	231134Z	13.0N 138.0E	SAT			(1H DATA)		NOAA-3			(CONF 01)					
41	231453Z	12.9N 137.3E	SAT			(1H DATA)		PCN 1 UMSP								
42	231455Z	13.6N 137.6E	SAT			(1H DATA)		PCN 3 UMSP								
43	232119Z	13.6N 136.7E	SAT			(1H DATA)		PCN 3 UMSP								
44	232120Z	13.3N 136.0E	P	1	2	700	170	82	70	35	70	80				4
45	232230Z	13.7N 136.5E	P	1	2	700	170	82	70	35	70	80				4
46	240001Z	13.2N 135.5E	SAT			(14.5/4.5 /01.0/24HRS)		NOAA-3			(CONF 01)					
47	240010Z	13.5N 136.9E	SAT			(1H DATA)		PCN 3 UMSP								
48	240010Z	14.0N 136.4E	SAT			(14.5/4.5 /01.5/24HRS)		PCN 3 UMSP								
49	240152Z	13.8N 136.4E	SAT			(1H DATA)		PCN 3 UMSP								
50	240328Z	13.9N 135.6E	P	2	2	700	190	75	90	80	75	90				4
51	240354Z	14.0N 135.7E	SAT			(1H DATA)		PCN 1 UMSP								
52	241003Z	14.5N 134.5E	SAT			(1H DATA)		PCN 1 UMSP								
53	241003Z	14.4N 134.7E	SAT			(1H DATA)		PCN 1 UMSP								
54	241050Z	14.5N 134.5E	SAT			(1H DATA)		NOAA-3			(CONF 01)					
55	241108Z	14.4N 134.6E	SAT			(1H DATA)		PCN 2 UMSP								
56	241434Z	14.7N 133.7E	SAT			(1H DATA)		PCN 1 UMSP								
57	242240Z	14.9N 133.4E	SAT			(1H DATA)		PCN 1 UMSP								
58	242314Z	15.0N 133.5E	SAT			(15.5/5.5 /01.0/24HRS)		NOAA-3			(CONF 01)					
59	242352Z	15.0N 133.3E	SAT			(15.0/5.0 /01.0/24HRS)		PCN 1 UMSP								
60	242352Z	15.0N 133.2E	SAT			(15.0/5.0 /00.5/24HRS)		PCN 1 UMSP								
61	250315Z	15.0N 133.0E	SAT			(15.5/5.5 / / HRS)		PCN 1 UMSP								
62	250315Z	15.0N 133.1E	SAT			(1H DATA)		PCN 1 UMSP								
63	250315Z	15.1N 133.2E	SAT			(15.0/5.0 / / HRS)		PCN 1 UMSP								
64	250947Z	15.3N 132.1E	SAT			(1H DATA)		PCN 1 UMSP								
65	250947Z	15.4N 131.9E	SAT			(1H DATA)		PCN 1 UMSP								
66	251000Z	15.4N 132.6E	P	4	1	700	270	100	160	50	90	70				6
67	251200Z	15.5N 132.3E	SAT			(1H DATA)		NOAA-3			(CONF 01)					
68	251233Z	15.6N 132.3E	SAT			(1H DATA)		PCN 1 UMSP								
69	251233Z	15.5N 132.5E	SAT			(1H DATA)		PCN 1 UMSP								
70	251557Z	15.7N 131.8E	SAT			(1H DATA)		PCN 1 UMSP								
71	251557Z	15.6N 131.9E	SAT			(1H DATA)		PCN 1 UMSP								
72	251557Z	15.6N 131.9E	SAT			(1H DATA)		PCN 1 UMSP								
73	251557Z	15.7N 132.0E	SAT			(1H DATA)		PCN 1 UMSP								
74	252230Z	15.6N 131.4E	SAT			(1H DATA)		PCN 1 UMSP								
75	252230Z	15.6N 131.3E	SAT			(1H DATA)		PCN 2 UMSP								
76	252333Z	15.8N 130.9E	SAT			(16.0/6.0 /00.5/24HRS)		PCN 1 UMSP								
77	252333Z	15.9N 130.8E	SAT			(16.0/6.0 /01.0/24HRS)		PCN 1 UMSP								
78	252333Z	16.1N 131.0E	SAT			(1H DATA)		PCN 1 UMSP								
79	260024Z	15.6N 130.8E	SAT			(15.5/5.5 / / HRS)		NOAA-3			(CONF 01)					
80	260257Z	15.6N 130.1E	SAT			(1H DATA)		PCN 1 UMSP								
81	260257Z	15.5N 130.3E	SAT			(1H DATA)		PCN 1 UMSP								
82	260257Z	15.6N 130.2E	SAT			(1H DATA)		PCN 1 UMSP								
83	260350Z	15.6N 130.3E	P	20	5	700	150	130	80	90	90	70				7
84	260635Z	15.7N 130.1E	P	20	5	700	-	-	-	-	-	-				7
85	261113Z	15.8N 128.9E	SAT			(1H DATA)		PCN 1 UMSP								
86	261114Z	15.9N 129.1E	SAT			(1H DATA)		PCN 1 UMSP								
87	261114Z	15.6N 128.9E	SAT			(1H DATA)		PCN 2 UMSP								
88	261115Z	15.5N 128.7E	SAT			(1H DATA)		NOAA-3			(CONF 02)					
89	261215Z	15.8N 128.7E	SAT			(1H DATA)		PCN 1 UMSP								
90	261215Z	15.8N 128.6E	SAT			(1H DATA)		PCN 1 UMSP								
91	261215Z	15.7N 128.6E	SAT			(1H DATA)		PCN 1 UMSP								
92	261538Z	15.9N 127.9E	SAT			(1H DATA)		PCN 1 UMSP								
93	261538Z	15.9N 127.8E	SAT			(1H DATA)		PCN 1 UMSP								
94	262242Z	15.7N 127.0E	P	1	2	700	290	137	190	40	-	-				8
95	262215Z	15.8N 126.8E	SAT			(1H DATA)		PCN 1 UMSP								
96	262215Z	16.2N 126.9E	SAT			(16.0/6.0 / / HRS)		PCN 1 UMSP								
97	262315Z	15.8N 126.5E	SAT			(16.0/6.0 / / HRS)		PCN 1 UMSP								
98	262315Z	16.0N 126.2E	SAT			(15.0/6.0 /01.0/24HRS)		PCN 1 UMSP								
99	262339Z	15.3N 126.1E	SAT			(15.5/5.5 / / HRS)		NOAA-3			(CONF 01)					
100	270238Z	15.7N 126.1E	SAT			(1H DATA)		PCN 1 UMSP								

TYPHOON IRMA  
FIX POSITIONS FOR CYCLONE NO. 34  
1200Z 21 NOV TO 0600Z 02 DEC

FIX NO.	TIME	POSIT	FIX CAT	ACCHY NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BRG WNG	MAX OBS SFC WIND VEL DIR WNG RNG	OBS MIN SLP	MIN /100MB MGT	FLT LVL TI/TO	EYE FORM	ORIEN- TATION	EYE DIA	POSIT OF RADAR	MSN NMHR
101	270238Z	15.7N 125.9E	SAT	(IH DATA			PCN 1 UMSP								
102	270238Z	15.8N 126.0E	SAT	(IH DATA			PCN 1 UMSP								
103	270455Z	15.7N 126.2E	P	10	5	700 280 162 180	30 - - -	940	256	19 13	CTRC		30		8
104	270800Z	15.6N 125.0E	LHDM	- 8493/										13.4N 123.7E	
105	271030Z	15.7N 124.5E	LHDM	- OPEN CIRCULAR EYE										18.1N 120.5E	
106	271038Z	15.5N 124.4E	SAT	(IH DATA			PCN 1 UMSP								
107	271058Z	15.5N 124.5E	SAT	(IH DATA			PCN 3 UMSP								
108	271100Z	15.6N 124.3E	LHDM	- 848//											
109	271156Z	15.6N 124.4E	SAT	(IH DATA			PCN 1 UMSP							13.4N 123.7E	
110	271157Z	15.7N 124.2E	SAT	(IH DATA			PCN 3 UMSP								
111	271200Z	15.6N 124.3E	LHDM	- CIRCULAR EYE, 25 NM DIAM											
112	271252Z	15.5N 124.0E	SAT	(IH DATA			NOAA-3					(CONF 01)		18.1N 120.5E	
113	271300Z	15.8N 124.2E	LHDM	- CIRCULAR EYE, 35 NM DIAM											
114	271400Z	15.6N 123.5E	LHDM	- 8472										18.4N 120.5E	
115	271400Z	15.6N 123.8E	LHDM	- CIRCULAR EYE, SEVERE ATTENUATION, 50 NM DIAM										13.4N 123.7E	
116	271500Z	15.7N 123.5E	LHDM	- CIRCULAR EYE, SEVERE ATTENUATION, 50 NM DIAM										18.1N 120.5E	
117	271520Z	15.5N 123.7E	SAT	(IH DATA			PCN 3 UMSP								
118	271520Z	15.7N 123.1E	SAT	(IH DATA			PCN 1 UMSP								
119	271600Z	15.5N 123.5E	LHDM	- SEVERE ATTENUATION											
120	271700Z	15.6N 123.4E	LHDM	- ELLIPTICAL AXIS E-W										18.1N 120.5E	
121	271800Z	15.5N 123.1E	LHDM	- ELLIPTICAL										18.1N 120.5E	
122	271900Z	15.5N 123.0E	LHDM	- ELLIPTICAL										18.1N 120.5E	
123	272000Z	15.5N 122.7E	LHDM	- ELLIPTICAL										18.1N 120.5E	
124	272152Z	15.6N 122.5E	LHDM	- CIRCULAR EYE, 50 NM DIAM										18.1N 120.5E	
125	272200Z	15.6N 121.9E	SAT	(IH DATA			PCN 5 UMSP							18.1N 120.5E	
126	272200Z	15.6N 122.2E	LHDM	- ELLIPTICAL EYE, 50 NM DIAM											
127	272300Z	15.5N 122.1E	LHDM	- CIRCULAR EYE, 50 NM DIAM										18.1N 120.5E	
128	280030Z	15.3N 121.6E	LHDM	- CIRCULAR EYE, 50 NM DIAM, 50 PERCENT WALL CLOUD										15.2N 120.6E	
129	280038Z	15.5N 121.3E	SAT	(TS.0/6.0-/W1.0/24HRS)			PCN 5 UMSP								
130	280050Z	15.4N 121.9E	SAT	(TS.5/3.5 /S /24HRS)			NON UMSP								
131	280100Z	15.4N 121.6E	LHDM	-											
132	280138Z	15.4N 121.4E	LHDM	- GOOD FIX, 15 DEG SPIRAL OVERLAY										18.1N 120.5E	
133	280210Z	15.3N 121.2E	LHDM	- 15 DEG SPIRAL OVERLAY										15.2N 120.6E	
134	280330Z	15.2N 121.0E	LHDM	- CIRCULAR EYE, 60 PERCENT WALL CLOUD, 27 NM DIAM										15.2N 120.6E	
135	280358Z	15.2N 121.0E	LHDM	- GOOD FIX, 60 PERCENT WALL CLOUD, CIRCULAR EYE, 27 NM DIAM										15.2N 120.6E	
136	280401Z	15.4N 120.7E	SAT	(IH DATA			PCN 6 UMSP								
137	280600Z	15.4N 120.6E	LHDM	- 2093/											
138	280700Z	15.5N 120.1E	LHDM	- 1190/										14.0N 121.0E	
139	281130Z	15.3N 119.7E	LHDM	- CIRCULAR EYE, 45 PERCENT WALL CLOUD, 45 NM DIAM										14.0N 121.0E	
140	281130Z	15.2N 119.8E	LHDM	- CIRCULAR EYE, 50 PERCENT WALL CLOUD, 40 NM DIAM										15.2N 120.6E	
141	281140Z	15.0N 118.0E	SAT	(IH DATA			NOAA-3					(CONF 01)			
142	281230Z	15.4N 119.4E	LHDM	- CIRCULAR EYE, 55-60 PERCENT WALL CLOUD, 35-45 NM DIAM										16.0N 120.3E	
143	281500Z	15.7N 118.2E	LHDM	- CIRCULAR EYE, OPEN E, 50 PERCENT WALL CLOUD, 25 NM DIAM										16.0N 120.3E	
144	281600Z	15.4N 118.2E	LHDM	- CIRCULAR EYE, 60 PERCENT WALL CLOUD, 28 NM DIAM										16.0N 120.3E	
145	281643Z	15.3N 117.7E	SAT	(IH DATA			PCN 6 UMSP								
146	281715Z	15.3N 118.5E	LHDM	- ELLIPTICAL EYE, 50 PERCENT WALL CLOUD										16.0N 120.3E	
147	281739Z	15.1N 118.6E	P	2	1	700 90 360 58	- - -	986	295	1/ 13	CTRC		25		9
148	281810Z	15.3N 118.2E	LHDM	- CIRCULAR EYE, OPEN E, 50 PERCENT WALL CLOUD, 18 NM DIAM										16.0N 120.3E	
149	282205Z	15.5N 117.8E	P	3	5	700 200 65 150	40 - - -	980	293	19 -	CTRC		30		11
150	290006Z	15.3N 117.8E	SAT	(TS.0/4.0 /D0.5/24HRS)			NOAA-3					(CONF 02)			
151	290020Z	15.4N 117.5E	SAT	(TS.0/4.0 / / HRS)			PCN 5 UMSP								
152	290020Z	15.3N 117.6E	SAT	(TS.0/4.0 /W1.0/24HRS)			PCN 3 UMSP								
153	290342Z	16.0N 116.8E	SAT	(IH DATA			PCN 3 UMSP								
154	290342Z	15.2N 110.4E	SAT	(TS.0/5.0 / / HRS)			PCN 3 UMSP								
155	291005Z	15.8N 115.7E	P	1	3	700 360 65 250	33 50 30	44	982	292	17 14	ELIP SE-NW	20X25		12
156	291250Z	16.4N 115.0E	SAT	(IH DATA			NOAA-3					(CONF 01)			
157	291302Z	15.9N 115.0E	SAT	(IH DATA			PCN 5 UMSP								
158	291302Z	15.4N 114.1E	SAT	(IH DATA			PCN 6 UMSP								
159	291624Z	15.9N 114.4E	SAT	(IH DATA			PCN 4 UMSP								
160	300002Z	16.4N 113.4E	SAT	(TS.0/4.0 /D1.0/24HRS)			PCN 1 UMSP								
161	300002Z	16.4N 113.5E	SAT	(TS.0/4.0-/D1.0/24HRS)			PCN 1 UMSP								
162	300114Z	15.8N 113.0E	SAT	(TS.5/4.5 /D0.5/24HRS)			NOAA-3					(CONF 01)			
163	300324Z	16.3N 113.1E	SAT	(IH DATA			PCN 1 UMSP								
164	300324Z	16.2N 112.9E	SAT	(TS.0/5.0 /S /24HRS)			PCN 1 UMSP								
165	300505Z	16.3N 113.0E	SAT	(IH DATA			PCN 2 UMSP								
166	301205Z	17.4N 112.2E	SAT	(IH DATA			NOAA-3					(CONF 02)			
167	301243Z	17.3N 112.3E	SAT	(IH DATA			PCN 1 UMSP								
168	301243Z	17.0N 112.2E	SAT	(IH DATA			PCN 1 UMSP								
169	301606Z	17.6N 112.1E	SAT	(IH DATA			PCN 1 UMSP								
170	301606Z	17.6N 111.8E	SAT	(IH DATA			PCN 3 UMSP								
171	010028Z	19.8N 111.9E	SAT	(TS.0/5.0-/D0.5/24HRS)			NOAA-3					(CONF 02)			
172	010129Z	18.7N 112.1E	SAT	(TS.0/4.0-/S /24HRS)			PCN 1 UMSP								
173	010447Z	19.2N 111.8E	SAT	(TS.0/6.0-/D1.0/24HRS)			PCN 1 UMSP								
174	011162Z	20.8N 112.0E	SAT	(IH DATA			NOAA-3					(CONF 02)			
175	011407Z	20.3N 112.0E	SAT	(IH DATA			PCN 4 UMSP								
176	011500Z	20.3N 111.7E	LHDM	- 55//4										22.3N 114.2E	
177	011728Z	20.9N 112.4E	SAT	(IH DATA			PCN 5 UMSP								
178	011800Z	21.8N 112.2E	LHDM	- 55//3										22.3N 114.2E	
179	020107Z	21.7N 113.4E	SAT	(IH DATA			PCN 5 UMSP								

TROPICAL STORM JUDY  
FIX POSITIONS FOR CYCLONE NO. 35  
0000Z 18 DEC TO 0000Z 19 DEC

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BKG RNG	MAX OBS SFC WIND VEL BKG RNG	OBS MIN SLP	MIN 700MB HGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF MAUAK	MSN NMBR
1	140050Z	8.0N 127.7E	SAT			(12.0/2.0 / / HRS)	PCN 5 UMSP								
2	150032Z	12.4N 122.5E	SAT			(11.5/1.5 / / HRS)	PCN 5 UMSP								
3	151313Z	12.3N 121.6E	SAT			(IR DATA )	PCN 6 UMSP								
4	160013Z	12.6N 119.7E	SAT			(11.5/1.5 /S /24HRS)	PCN 5 UMSP								
5	161325Z	13.5N 116.8E	SAT			(IR DATA )	NOAA-4							(CONF 02)	
6	162355Z	14.8N 115.8E	SAT			(IR DATA )	PCN 5 UMSP								
7	170150Z	13.8N 116.0E	SAT			(12.5/2.5 /01.0/25HRS)	NOAA-4							(CONF 02)	
8	171237Z	15.1N 113.5E	SAT			(IR DATA )	PCN 6 UMSP								
9	171311Z	16.0N 113.5E	SAT			(IR DATA )	NOAA-4							(CONF 02)	
10	180129Z	13.2N 112.5E	SAT			(13.0/3.0 /00.5/24HRS)	NOAA-4							(CONF 01)	
11	180936Z	12.9N 112.0E	SAT			(12.0/2.0 / / HRS)	PCN 5 UMSP								
12	181210Z	12.5N 109.8E	SAT			(IR DATA )	NOAA-4							(CONF 03)	
13	181717Z	12.7N 109.1E	SAT			(IR DATA )	PCN 5 UMSP								

TROPICAL STORM KIT  
FIX POSITIONS FOR CYCLONE NO. 36  
0600Z 19 DEC TO 0600Z 24 DEC

FIX NO.	TIME	POSIT	FIX CAT	ACCRV NAV-MET	FIX LVL	MAX OBS FLT LVL WIND DIR VEL BKG RNG	MAX OBS SFC WIND VEL BKG RNG	OBS MIN SLP	MIN 700MB HGT	FLT LVL TI/TO	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF MAUAK	SN NMBR
1	171055Z	5.5N 143.0E	SAT			(IR DATA )	PCN 6 UMSP								
2	172317Z	7.0N 140.9E	SAT			(11.5/1.5 / / HRS)	PCN 5 UMSP								
3	180254Z	8.0N 136.2E	SAT			(IR DATA )	PCN 5 UMSP								
4	181218Z	11.0N 135.5E	SAT			(IR DATA )	PCN 6 UMSP								
5	182318Z	10.2N 134.4E	SAT			(12.0/2.0 /00.5/24HRS)	PCN 3 UMSP								
6	190029Z	12.0N 132.9E	SAT			(11.5/1.5 /00.5/24HRS)	NOAA-4							(CONF 02)	
7	190235Z	10.0N 133.4E	SAT			(IR DATA )	PCN 3 UMSP								
8	190235Z	10.9N 133.0E	SAT			(12.0/2.0 / / HRS)	PCN 5 UMSP								
9	191200Z	11.3N 130.3E	SAT			(IR DATA )	PCN 6 UMSP								
10	191516Z	11.6N 129.2E	SAT			(IR DATA )	PCN 5 UMSP								
11	191517Z	11.5N 129.6E	SAT			(IR DATA )	PCN 6 UMSP								
12	200042Z	11.9N 128.0E	SAT			(11.5/1.5 / / HRS)	PCN 5 UMSP							(CONF 02)	
13	200125Z	11.0N 127.5E	SAT			(12.5/2.5 /01.0/25HRS)	NOAA-4								
14	200358Z	11.0N 127.4E	SAT			(IR DATA )	PCN 5 UMSP								
15	200955Z	10.0N 125.2E	SAT			5 5 700 250 30 150	NOAA-4							(CONF 02)	2
16	201206Z	13.0N 124.0E	SAT			(IR DATA )	PCN 5 UMSP								
17	201523Z	10.6N 123.9E	SAT			(IR DATA )	PCN 5 UMSP								
18	201840Z	11.5N 124.1E	SAT			(IR DATA )	PCN 5 UMSP								
19	210032Z	11.3N 122.7E	SAT			(11.0/1.5 / / HRS)	PCN 5 UMSP								
20	210024Z	14.2N 122.0E	SAT			(12.5/2.5 /S /24HRS)	NOAA-4							(CONF 02)	
21	210340Z	11.3N 121.9E	SAT			(IR DATA )	PCN 3 UMSP								
22	210340Z	11.3N 121.9E	SAT			(11.0/1.0 / / HRS)	PCN 3 UMSP								
23	211322Z	14.0N 118.0E	SAT			(IR DATA )	NOAA-4							(CONF 02)	
24	220005Z	10.2N 117.1E	SAT			(11.0/1.5 /00.5/24HRS)	PCN 5 UMSP								
25	221201Z	13.0N 115.0E	SAT			(IR DATA )	NOAA-4							(CONF 01)	
26	221247Z	13.1N 114.5E	SAT			(IR DATA )	PCN 6 UMSP								
27	230128Z	7.1N 112.5E	SAT			(12.0/2.0 / / HRS)	PCN 3 UMSP								
28	230128Z	7.5N 112.7E	SAT			(12.0/2.0 / / HRS)	PCN 3 UMSP								
29	231255Z	7.0N 109.0E	SAT			(IR DATA )	NOAA-4							(CONF 02)	
30	231414Z	7.5N 110.1E	SAT			(IR DATA )	PCN 5 UMSP								
31	231725Z	7.0N 109.3E	SAT			(IR DATA )	PCN 5 UMSP								
32	240110Z	7.0N 109.0E	SAT			(12.0/2.0 / / HRS)	PCN 3 UMSP								
33	240110Z	7.1N 109.0E	SAT			(12.0/2.0 /S /24HRS)	PCN 3 UMSP								
34	240115Z	7.1N 106.5E	SAT			(11.5/1.5 /00.5/24HRS)	NOAA-4							(CONF 01)	
35	240420Z	7.0N 107.1E	SAT			(IR DATA )	PCN 5 UMSP								

# CHAPTER V — SUMMARY OF FORECAST VERIFICATION DATA

## 1. ANNUAL FORECAST VERIFICATION

### a. POSITION FORECAST-VERIFICATION

Forecast positions for the warning, 24-, 48-, and 72-hour forecasts are verified against the best track using two criteria:

(1) Only those forecasts for tropical cyclones which reach typhoon intensity and the best track winds are 35 kts or greater are verified; and

(2) All forecasts for which best track positions exist are verified.

The position verification statistics for tropical cyclones meeting criteria (1) above are found in Table 5-1. The 24- and 48-hour errors are essentially the same as the long term mean, however the unusually large 72-hour error is attributable to several extremely erratic storms during the 1974 season. The major problem was failure to correctly forecast recurvature (or non-recurvature) in these storms, resulting in anomalously large 72-hour errors. This same information is depicted graphically in Figure 5-1, with a five year cumulative mean shown which eliminates short term variations. It

TABLE 5-1. JTWC ANNUAL AVERAGE POSITION FORECAST ERROR FOR-TYPHOONS WHILE WIND OVER 35 KNOTS

	24-HR	48-HR	72-HR
1950-58	170	---	---
1959	*117	*267	---
1960	177	354	---
1961	136	274	---
1962	144	287	476
1963	127	246	374
1964	133	284	429
1965	151	303	418
1966	136	280	432
1967	125	276	414
1968	105	229	337
1969	111	237	349
1970	98	181	272
1971	99	203	308
1972	116	245	382
1973	102	193	245
1974	114	218	351

\*Forecast positions north of 35°N were not verified.

TABLE 5-2. 1974 JTWC ERROR SUMMARY

(Average errors given in nautical miles)

CYCLONE	WARNING			24 HOUR			48 HOUR			72 HOUR		
	POSIT ERROR	RT ANGLE ERROR	# WRNGS	FCST ERROR	RT ANGLE ERROR	# CASES	FCST ERROR	RT ANGLE ERROR	# CASES	FCST ERROR	RT ANGLE ERROR	# CASES
1. TS WANDA	43	33	13	195	117	9	404	189	5	475	270	1
2. TS AMY	31	20	19	136	54	15	---	---	---	---	---	---
3. TS BABE	19	15	21	112	82	17	---	---	---	---	---	---
4. TY CARLA	17	17	20	87	38	16	182	75	11	196	136	7
5. TD 05	31	11	5	73	33	1	---	---	---	---	---	---
6. TY DINAH	29	23	26	176	86	21	193	154	18	343	316	11
7. TS EMMA	26	14	21	115	72	17	240	180	7	371	302	3
8. TS FREDIA	36	16	7	114	61	3	---	---	---	---	---	---
9. TY GILDA	20	15	28	66	42	24	65	34	18	109	75	14
10. TS HARRIET	24	16	13	143	112	9	187	98	3	182	41	1
11. TS JEAN	14	11	13	86	51	9	194	194	1	---	---	---
12. TY IVY	13	10	22	107	61	18	225	190	11	465	422	7
13. TS KIM	47	39	6	103	24	2	---	---	---	---	---	---
14. TS LUCY	47	27	10	176	98	6	---	---	---	---	---	---
15. TY MARY	32	23	46	138	98	38	242	186	24	368	267	15
16. TD 15	49	42	5	203	186	1	---	---	---	---	---	---
17. TS NADINE	47	23	13	229	84	9	316	41	2	---	---	---
18.				(CENTRAL PACIFIC HURRICANE CENTER)								
19. TY POLLY	17	13	31	160	106	27	320	215	19	367	233	11
20. TD 20	36	23	6	375	275	2	---	---	---	---	---	---
21. TS ROSE	19	12	13	198	105	9	315	261	4	---	---	---
22. TY SHIRLEY	14	10	20	116	75	16	265	137	9	521	350	5
23. TS TRIX	15	12	5	114	38	1	---	---	---	---	---	---
24. TY VIRGINIA	18	12	15	169	145	11	640	616	1	---	---	---
25. TS WENDY	19	14	24	136	104	20	310	279	11	526	452	4
26. TY AGNES	18	12	24	100	73	20	231	140	16	410	249	12
27. TY BESS	24	9	20	81	42	16	149	85	12	243	85	8
28. TY CARMEN	18	12	21	103	40	17	172	115	10	249	186	7
29. TY DELLA	13	9	25	127	89	21	373	250	16	714	477	7
30. TY ELAINE	14	9	29	94	75	25	158	97	18	250	152	14
31. TS FAYE	22	11	13	92	30	9	181	69	2	---	---	---
32. TY GLORIA	17	12	27	160	103	23	220	166	18	275	197	14
33. TS HESTER	22	16	5	48	48	1	---	---	---	---	---	---
34. TY IRMA	15	9	44	90	62	40	217	168	30	459	318	26
35. TS JUDY	48	37	5	146	146	2	---	---	---	---	---	---
36. TS KIT	34	24	14	71	55	10	128	124	5	206	196	5
ALL FORECASTS	23	15	627	120	78	483	226	157	271	348	245	172
*TYPHOONS	19	13	364	114	75	374	218	150	222	351	243	151

\*Includes only forecasts on cyclones that became typhoons and only when verifying best track wind was 35 kt.

can be seen from the five year mean that position forecast errors have asymptotically approached the 100-200-300 nm plateaus for the forecast intervals. Error statistics for individual cases are listed in detail in sections 3 and 4 below for various categories of storms, and are summarized in Table 5-2.

In addition to the methods described above for verifying absolute error distance (vector error), a computation of closest distance to the best track (right angle error) is also calculated. Right angle error, graphically depicted in Figure 5-2, is a measure of ability to forecast the path of motion without regard to speed.

#### b. INTENSITY FORECAST VERIFICATION

Intensity verification statistics for tropical cyclones meeting criteria (1) above are found in Table 5-3. Increased understanding of relationships between minimum sea level pressure and surface winds and improvements in estimating surface wind from measured flight level wind have resulted in a significantly lower error for the initial (warning position) error for 1974. The more accurate initial intensity, combined with careful application of the Dvorak model and known intensity trends, resulted in significantly reduced intensity errors at all forecast intervals for the past season.

TABLE 5-3. JTWC ANNUAL AVERAGE INTENSITY FORECAST ERROR FOR TYPHOONS WHILE WIND OVER 35 KNOTS

	WARNING POSITION	24-HR	48-HR	72-HR
1971	7.1	15.8	20.7	23.8
1972	8.6	13.5	19.7	23.8
1973	6.5	16.0	20.4	28.4
1974	4.4	11.0	15.4	19.5
AVG	7.0	14.0	19.2	23.4

## 2. COMPARISON OF OBJECTIVE TECHNIQUES

#### a. GENERAL

Objective techniques have been verified annually since 1967, however year-to-year modifications and improvements prevent any long term comparisons of the various techniques. The dynamic objective forecast techniques all employ the steering concept of a point vortex in a smoothed

large-scale flow field. The analog technique provides two movement forecasts, one for those analog storms which recurved and another for non-recurvers as well as an intensity forecast for each. An intensity forecast scheme based on statistical regression equations was evaluated during 1974, and will be used operationally in 1975.

#### b. DISCUSSION OF OBJECTIVE TECHNIQUES:

(1) EXTRAPOLATION - Past 12-hour movement derived from current warning position and 12-hour old preliminary best track position is linearly extrapolated to 24 and 48 hours.

(2) MOHATT 700/500 - Steering program which advects a point vortex on a pre-selected analysis or prognostic SR (space mean) field at the designated upper levels in six-hour time steps through 72 hours. Utilizing the previous 12-hour history position, MOHATT computes the 12-hour forecast error and applies a bias correction to the forecast position.

(3) TYMOD 12/24 - Steering program which advects a point vortex using FNWC Monterey's global band upper-air prognostic fields out to 72 hours. Forecasts are provided for no history, 12-hour history and 24-hour history. Bias corrections are applied based on 12-hour and 24-hour forecast errors determined from the history positions.

(4) TYFOON - 73 - Analog program which scans history tapes for storms similar (within a specified acceptance envelope) to the storm in question. The history tapes are divided into storms which recurved and those which moved generally towards the west. Two 72 hour forecasts are thus provided, and, based on many other considerations, the appropriate one chosen. The TYFOON 73 program also provides analog intensities out to 72 hours.

(5) FCSTINT - Intensity forecast program which utilizes statistical regression equations to provide forecasts out to 72 hours.

#### c. TESTING AND RESULTS:

It is of some interest to compare the performance of the objective techniques to each other and to the official forecast as well. This information is listed in Table 5-4 for typhoons only and in Table 5-5 for all forecasts. Care must be exercised in interpreting the results for the TYFS and TYFR (TYFOON-73 for straight and recurve data tapes), since both outputs were considered for each forecast. Because of procedural changes in the numerical model that TYMOD and MOHATT employ, these techniques continue to exhibit poor performance in the mean at each forecast interval. Research is currently planned to develop a new steering technique designed to eliminate these problems.

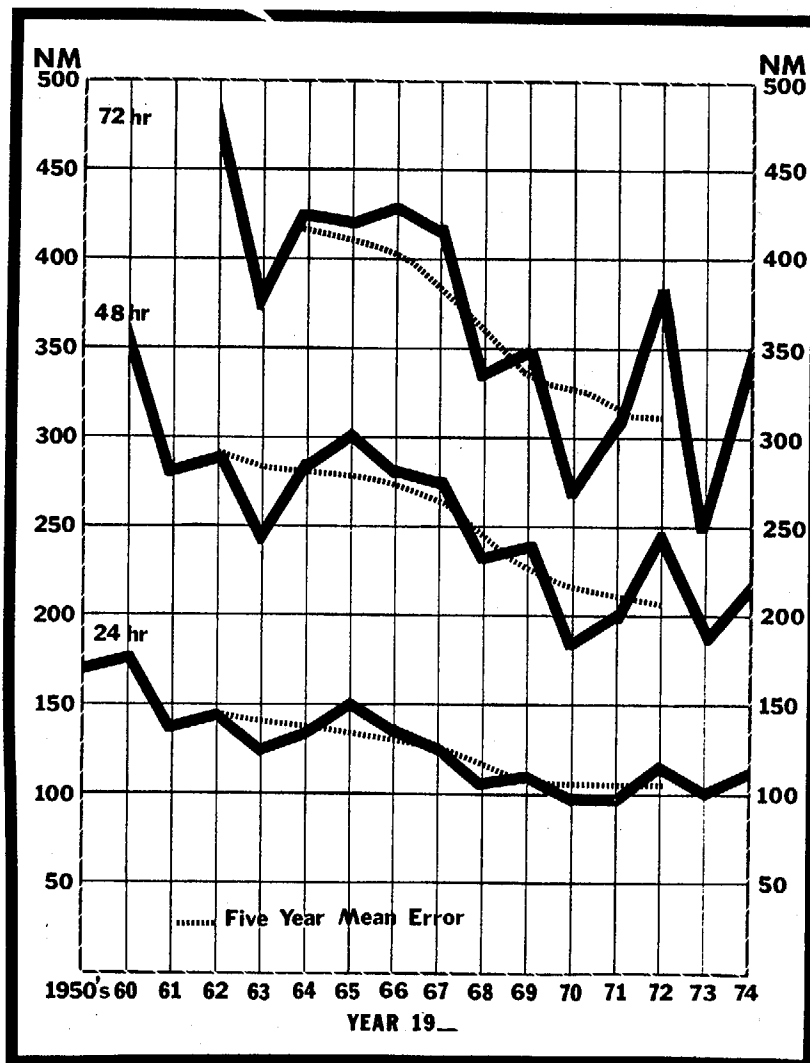


FIGURE 5-1. Mean vector error.

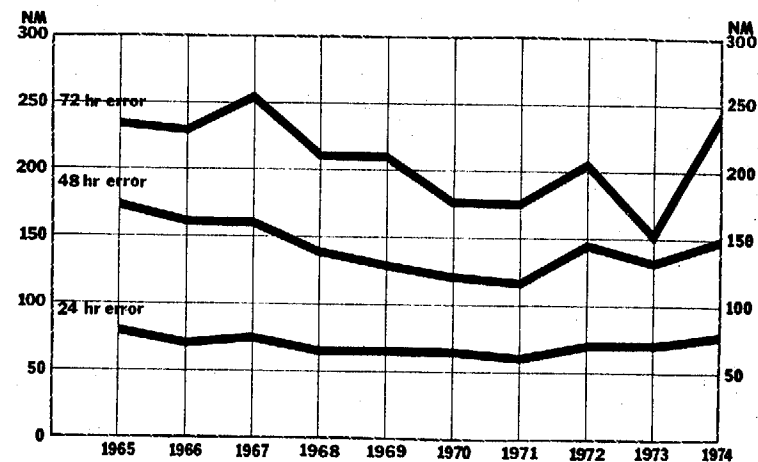


FIGURE 5-2. Mean right angle error.



TABLE 5-4. 1974 OBJECTIVE TECHNIQUES FOR TYPHOONS ONLY (see criterion a)

24-HOUR																
	JTWC		XTRP		TY12		TY24		TYFS		TYFR		MH70		MH50	
JTWC	324	114														
	114	0														
XTRP	308	116	308	123												
	123	0	123	0												
TY12	189	120	179	126	189	189										
	189	69	182	56	189	0										
TY24	181	120	171	126	179	182	181	204								
	204	84	201	75	204	22	204	0								
TYFS	283	112	268	121	177	186	168	205	283	124						
	124	12	122	2	128	-57	123	-62	124	0						
TYFR	288	118	273	124	181	189	172	207	273	125	288	144				
	144	26	144	20	145	-43	144	-63	143	18	144	0				
MH70	242	119	230	125	164	191	157	211	224	127	229	146	242	150		
	150	32	147	22	149	-42	144	-07	148	22	152	6	150	0		
MH50	233	120	222	127	161	189	154	211	217	128	221	146	231	152	235	149
	149	29	146	19	147	-43	142	-69	148	19	149	3	147	-4	149	0

NUMBER OF CASES	X-AXIS TECHNIQUES ERROR
Y-AXIS TECHNIQUE ERROR	ERROR DIFFERENCE Y-X

# 48-HOUR

	<u>JTWC</u>		<u>XTRP</u>		<u>TY12</u>		<u>TY24</u>		<u>TYFS</u>		<u>TYFR</u>		<u>MH70</u>		<u>MH50</u>	
JTWC	222	218														
	218	0														
XTRP	222	217	231	228												
	226	9	228	0												
TY12	135	214	133	229	147	407										
	412	197	394	165	407	0										
TY24	127	217	129	229	138	387	141	405								
	409	192	405	176	408	21	405	0								
TYFS	217	217	215	228	142	401	134	402	233	223						
	213	-4	214	-14	231	-171	223	-179	223	0						
TYFR	215	220	213	230	145	410	137	410	226	221	233	292				
	283	63	287	56	299	-111	300	-110	286	65	292	0				
MH70	176	221	175	234	128	405	121	421	183	224	185	297	191	317		
	316	95	313	79	315	-89	316	-105	316	93	319	22	317	0		
MH50	166	225	166	237	124	403	118	420	174	225	177	298	181	319	181	384
	382	157	382	146	388	-15	386	-35	380	155	388	90	384	65	384	0

JTWC - OFFICIAL JTWC SUBJECTIVE FORECAST  
 XTRP - EXTRAPOLATION  
 TY12 - TYMOD WITH 12-HR HISTORY  
 TY24 - TYMOD WITH 24-HR HISTORY  
 TYFS - TYFOON (WEIGHTED CLIMO) STRAIGHT  
 TYFR - TYFOON (WEIGHTED CLIMO) RECURVE  
 MH70 - MOHATT 700-MB PROG  
 MH50 - MOHATT 500-MB PROG

JTWC - OFFICIAL JTWC SUBJECTIVE FORECAST  
XTRP - EXTRAPOLATION  
TY12 - TYMOD WITH 12-HR HISTORY  
TY24 - TYMOD WITH 24-HR HISTORY  
TYFS - TYFOON (WEIGHTED CLIMO) STRAIGHT  
TYFR - TYFOON (WEIGHTED CLIMO) RECURVE  
MH70 - MOHATT 700-MB PROG  
MH50 - MOHATT 500-MB PROG

72-HOUR														
	<u>JTWC</u>		<u>TY12</u>		<u>TY24</u>		<u>TYFS</u>		<u>TYFR</u>		<u>MH70</u>		<u>MH50</u>	
JTWC	151	351												
	351	0												
TY12	93	351	105	615										
	588	237	615	0										
TY24	88	365	97	592	102	613								
	612	247	600	7	613	0								
TYFS	146	348	103	621	98	620	173	296						
	271	-77	325	-296	314	-306	296	0						
TYFR	144	350	101	628	96	624	169	294	170	493				
	442	91	500	-128	507	-117	495	201	493	0				
MH70	121	352	91	638	86	640	134	316	134	492	139	570		
	525	173	580	-58	590	-50	577	261	579	88	576	0		
MH50	113	360	88	639	84	645	127	308	127	470	130	569	130	749
	747	387	744	105	751	106	750	442	752	282	749	180	749	0

TABLE 5-5. 1974 OBJECTIVE TECHNIQUES FOR ALL FORECASTS (see criterion b)

24-HOUR													
	JTWC	XTRP	TY12	TY24	TYFS	TYFR	MH70	MH50					
JTWC	481 120 120 0												
XTRP	425 117 132 14	425 132 152 0											
TY12	267 130 197 67	253 137 192 55	267 197 197 0										
TY24	258 131 218 87	247 137 208 71	255 191 219 27	258 218 218 0									
TYFS	362 117 154 17	342 128 129 0	233 192 135 -57	223 212 131 -81	362 134 134 0								
TYFR	372 122 152 30	352 131 148 17	242 194 149 -45	231 213 149 -65	350 136 151 16	372 152 152 0							
MH70	323 125 160 35	306 132 157 25	228 195 157 -38	219 222 154 -68	286 130 159 28	296 147 161 13	325 160 160 0						
MH50	307 125 151 25	292 132 148 16	219 194 148 -46	210 222 145 -79	278 132 149 17	287 140 150 2	305 161 149 12	307 151 151 0					

NUMBER OF CASES	X-AXIS TECHNIQUES ERROR
Y-AXIS TECHNIQUES ERROR	ERROR DIFFERENCE Y-X

48-HOUR													
	JTWC	XTRP	TY12	TY24	TYFS	TYFR	MH70	MH50					
JTWC	272 226 226 0												
XTRP	257 223 243 20	288 249 249 0											
TY12	159 223 438 215	174 257 430 172	192 435 435 0										
TY24	149 225 436 213	168 259 443 184	180 419 443 26	184 440 440 0									
TYFS	244 222 222 0	256 238 225 -15	176 425 237 -188	166 430 230 -200	279 238 238 0								
TYFR	244 225 284 59	257 242 288 46	183 433 303 -130	172 439 303 -136	272 237 294 57	283 299 299 0							
MH70	201 227 355 108	215 245 334 88	164 425 342 -83	154 448 343 -105	219 227 337 110	225 296 338 42	235 339 339 0						
MH50	190 230 384 154	203 244 377 133	157 422 368 -54	148 445 365 -79	210 228 375 147	217 297 381 83	222 341 379 38	222 379 379 0					

JTWC - OFFICIAL JTWC SUBJECTIVE FORECAST  
XTRP - EXTRAPOLATION  
TY12 - TYMOD WITH 12-HR HISTORY  
TY24 - TYMOD WITH 24-HR HISTORY  
TYFS - TYFCON (WEIGHTED CLIMO) STRAIGHT  
TYFR - TYFCON (WEIGHTED CLIMO) RECURVE  
MH70 - MOHATT 700-MB PROG  
MH50 - MOHATT 500-MB PROG

72-HOUR													
	JTWC	TY12	TY24	TYFS	TYFR	MH70	MH50						
JTWC	172 348 348 0												
TY12	99 350 595 246	129 646 646 0											
TY24	94 362 616 253	120 626 629 3	125 639 639 0										
TYFS	156 351 288 -64	123 648 330 -318	118 646 321 -326	199 319 319 0									
TYFR	153 352 441 89	123 660 505 -154	117 652 511 -141	194 316 497 181	197 497 497 0								
MH70	130 353 579 226	113 670 618 -53	107 669 626 -43	157 332 622 290	158 496 606 110	165 620 620 0							
MH50	122 361 737 376	109 672 700 28	104 674 704 30	150 326 732 407	151 478 730 252	155 616 731 115	155 731 731 0						

### 3. TROPICAL STORM AND DEPRESSION DATA

#### TROPICAL STORM WANDA 0000Z 10 JAN TO 1200Z 13 JAN

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST				
	POSIT	WIND		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		
						DST	WIND			DST	WIND			DST	WIND			DST	WIND	
100000Z	9.9N	130.9E	45	10.0N	131.0E	45	8	0	12.0N	130.6E	55	176	10	14.0N	131.0E	60	352	30	17.6N	134.0E
100600Z	10.4N	131.0E	50	10.4N	131.9E	50	18	0	11.4N	130.6E	60	246	20	14.0N	129.8E	60	522	30	--	--
101200Z	11.0N	132.3E	50	11.1N	131.6E	50	41	0	13.4N	131.0E	60	268	30	15.7N	133.0E	60	396	30	--	--
101800Z	11.7N	132.9E	55	11.9N	131.7E	50	71	-5	13.9N	132.7E	60	234	30	15.5N	135.5E	60	330	30	--	--
110000Z	12.3N	133.6E	45	12.5N	131.7E	50	111	5	14.5N	132.9E	60	287	30	16.5N	135.5E	55	419	30	--	--
110600Z	12.7N	134.6E	40	13.1N	134.1E	45	38	5	16.1N	138.1E	35	115	5	--	--	--	--	--	--	
111200Z	13.1N	135.6E	30	15.0N	136.0E	40	116	10	18.4N	142.0E	30	254	0	--	--	--	--	--	--	
111800Z	13.4N	136.7E	30	12.5N	137.3E	30	64	0	13.7N	142.4E	20	100	-10	--	--	--	--	--	--	
120000Z	13.8N	137.8E	30	13.7N	138.2E	30	24	0	15.4N	143.6E	25	71	0	--	--	--	--	--	--	
120600Z	14.3N	138.8E	30	14.1N	138.8E	30	12	0	--	--	--	--	--	--	--	--	--	--	--	
121200Z	14.7N	139.8E	30	14.8N	139.8E	30	6	0	--	--	--	--	--	--	--	--	--	--	--	
121800Z	14.9N	141.2E	30	15.0N	140.5E	30	41	0	--	--	--	--	--	--	--	--	--	--	--	
130000Z	14.9N	142.6E	25	15.0N	142.6E	30	6	5	--	--	--	--	--	--	--	--	--	--	--	

#### TROPICAL STORM AMY 1200Z 14 MAR TO 1200Z 19 MAR

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS	
						DST	WIND			DST	WIND			DST	WIND			DST	WIND
141200Z	8.4N	142.6E	25	8.3N	142.3E	30	19	5	8.8N	139.2E	40	48	15	--	--	--	--	--	--
141800Z	8.5N	142.3E	25	8.4N	141.9E	30	24	5	9.0N	138.6E	40	21	15	--	--	--	--	--	--
150000Z	8.7N	141.7E	25	8.6N	141.3E	30	24	5	9.4N	139.1E	40	103	15	--	--	--	--	--	--
150600Z	9.1N	140.9E	25	8.7N	140.6E	30	30	5	9.7N	138.4E	25	134	0	--	--	--	--	--	--
151200Z	9.2N	139.9E	25	9.0N	140.1E	30	17	5	9.7N	138.0E	25	147	0	--	--	--	--	--	--
151800Z	9.3N	138.8E	25	9.3N	139.4E	30	35	5	10.7N	137.4E	25	146	0	--	--	--	--	--	--
160000Z	9.8N	137.4E	25	9.6N	137.6E	25	17	0	10.1N	133.7E	35	260	5	--	--	--	--	--	--
160600Z	10.7N	136.7E	25	9.6N	136.6E	30	66	5	10.4N	132.7E	40	359	5	--	--	--	--	--	--
161200Z	11.5N	136.3E	25	11.6N	136.5E	30	13	5	15.1N	135.6E	40	150	5	--	--	--	--	--	--
161800Z	12.4N	136.3E	25	12.2N	136.3E	30	12	5	15.3N	135.7E	40	210	0	--	--	--	--	--	--
170000Z	13.4N	136.6E	30	13.2N	136.8E	30	17	0	16.5N	139.1E	35	85	-5	--	--	--	--	--	--
170600Z	14.4N	137.3E	35	14.3N	137.4E	30	8	-5	17.5N	141.5E	30	53	-10	--	--	--	--	--	--
171200Z	15.3N	138.2E	35	15.3N	138.4E	35	12	0	18.5N	143.0E	30	54	-15	--	--	--	--	--	--
171800Z	16.3N	139.2E	40	16.0N	139.3E	35	19	-5	19.0N	144.0E	30	131	-15	--	--	--	--	--	--
180000Z	17.2N	140.4E	40	17.5N	140.4E	35	18	-5	20.3N	146.3E	25	139	-15	--	--	--	--	--	--
180600Z	18.3N	141.9E	40	18.4N	141.7E	35	13	-5	--	--	--	--	--	--	--	--	--	--	--
181200Z	19.2N	143.6E	45	20.0N	144.6E	35	74	-10	--	--	--	--	--	--	--	--	--	--	--
181800Z	20.4N	145.8E	45	19.7N	145.2E	35	54	-10	--	--	--	--	--	--	--	--	--	--	--
190000Z	21.8N	148.2E	40	22.6N	150.1E	45	115	5	--	--	--	--	--	--	--	--	--	--	--

#### TROPICAL STORM BABE 0000Z 26 APR TO 0600Z 02 MAY

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS		POSIT	WIND	ERRORS	
						DST	WIND			DST	WIND			DST	WIND			DST	WIND
260000Z	9.5N	147.2E	20	9.3N	147.4E	25	17	5	12.0N	144.0E	40	84	15	--	--	--	--	--	--
260600Z	10.3N	146.4E	20	10.3N	146.5E	25	6	5	13.6N	143.6E	40	112	15	--	--	--	--	--	--
261200Z	11.3N	145.7E	25	11.4N	145.2E	25	30	0	14.8N	142.0E	40	224	15	--	--	--	--	--	--
261800Z	12.1N	145.4E	25	12.4N	145.1E	30	25	5	16.4N	142.8E	45	197	15	--	--	--	--	--	--
270000Z	12.6N	145.3E	25	12.5N	145.3E	30	6	5	14.9N	144.8E	40	75	10	--	--	--	--	--	--
270600Z	13.3N	145.5E	25	13.2N	145.3E	30	13	5	16.0N	145.4E	35	21	5	--	--	--	--	--	--
271200Z	14.1N	145.8E	25	14.0N	145.6E	30	13	5	17.5N	147.0E	35	93	5	--	--	--	--	--	--
271800Z	15.0N	145.9E	30	15.0N	145.9E	30	0	0	18.5N	147.6E	35	136	5	--	--	--	--	--	--
280000Z	15.7N	145.8E	30	16.3N	146.2E	30	43	0	20.7N	148.2E	25	222	-10	--	--	--	--	--	--
280600Z	16.3N	145.6E	30	16.4N	145.4E	30	13	0	19.7N	144.9E	30	61	-10	--	--	--	--	--	--
281200Z	16.9N	145.5E	30	17.0N	145.4E	30	8	0	20.4N	145.6E	25	82	-20	--	--	--	--	--	--
281800Z	17.6N	145.4E	30	18.0N	145.6E	30	26	0	22.1N	146.6E	25	175	-25	--	--	--	--	--	--
290000Z	18.3N	145.2E	35	18.2N	145.0E	30	13	-5	21.3N	144.7E	35	72	-20	--	--	--	--	--	--
290600Z	18.7N	145.1E	40	18.9N	145.2E	40	13	0	22.5N	146.1E	50	135	-10	--	--	--	--	--	--
291200Z	19.2N	144.9E	45	19.2N	145.1E	40	11	-5	21.4N	145.6E	45	60	-15	--	--	--	--	--	--
291800Z	19.7N	144.8E	50	20.1N	145.3E	45	37	-5	23.4N	146.6E	50	97	-10	--	--	--	--	--	--
300000Z	20.1N	144.6E	55	20.4N	145.3E	45	43	-10	23.7N	146.8E	35	55	-20	--	--	--	--	--	--
300600Z	20.8N	144.5E	60	20.7N	144.1E	45	23	-15	--	--	--	--	--	--	--	--	--	--	--
301200Z	21.5N	144.4E	60	21.8N	144.5E	55	19	-5	--	--	--	--	--	--	--	--	--	--	--
301800Z	22.4N	145.2E	60	22.4N	145.3E	55	6	-5	--	--	--	--	--	--	--	--	--	--	--
010000Z	23.2N	145.8E	55	22.9N	146.4E	50	38	-5	--	--	--	--	--	--	--	--	--	--	--

TROPICAL DEPRESSION 05  
0600Z 07 JUN TO 0600Z 08 JUN

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		48 HOUR FORECAST		72 HOUR FORECAST	
	POSIT	WIND	POSIT	WIND	OST	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
070000Z	20.3N	112.4E	30	20.1N	113.2E	30	21	0	21.4N	112.4E	45	73
071200Z	20.7N	112.0E	30	20.2N	112.8E	30	32	0	21.4N	112.4E	45	73
071800Z	21.2N	112.2E	30	20.8N	112.5E	30	29	0	21.4N	112.4E	45	73
080000Z	21.6N	111.7E	30	21.2N	112.4E	30	46	0	21.4N	112.4E	45	73
080000Z	22.0N	111.1E	20	21.6N	111.4E	30	29	10	21.4N	112.4E	45	73

TROPICAL STORM EMMA  
0600Z 13 JUN TO 0600Z 18 JUN

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		48 HOUR FORECAST		72 HOUR FORECAST	
	POSIT	WIND	POSIT	WIND	OST	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
130000Z	11.9N	134.7E	25	12.1N	135.2E	25	32	0	14.3N	130.4E	35	75
131200Z	12.3N	134.3E	30	12.7N	132.9E	30	33	0	13.9N	128.1E	40	66
131800Z	12.4N	131.9E	30	12.9N	131.8E	30	6	0	14.1N	126.8E	40	93
140000Z	13.7N	130.7E	35	13.3N	130.5E	30	27	-5	14.7N	125.9E	40	68
140000Z	14.4N	129.0E	35	14.5N	129.4E	30	13	-5	16.7N	124.2E	40	92
141200Z	14.9N	128.0E	40	15.1N	128.7E	30	13	-10	18.2N	125.0E	40	90
141800Z	15.4N	127.7E	45	15.5N	127.6E	35	8	-10	18.1N	124.3E	50	94
150000Z	15.9N	126.4E	50	15.7N	127.0E	40	17	-10	18.3N	124.2E	55	42
150000Z	16.3N	125.4E	55	16.3N	125.2E	50	34	-5	19.0N	121.4E	65	149
151200Z	16.7N	125.0E	60	17.1N	125.0E	55	24	-5	20.3N	121.9E	75	143
151800Z	17.2N	124.4E	60	17.3N	124.2E	60	13	0	20.2N	121.4E	75	150
160000Z	17.6N	124.2E	55	17.8N	124.1E	55	13	0	20.7N	123.8E	50	45
160000Z	18.2N	123.4E	50	18.2N	124.0E	50	6	0	21.0N	124.0E	45	56
161200Z	18.7N	123.4E	45	19.2N	123.5E	55	34	10	22.4N	123.8E	55	117
161800Z	19.3N	123.4E	45	19.5N	123.5E	50	26	5	22.7N	124.0E	45	190
170000Z	20.1N	124.3E	40	20.1N	124.0E	50	17	10	23.1N	125.4E	45	257
170000Z	20.9N	125.0E	40	21.1N	124.4E	45	36	5	24.7N	127.2E	35	237
171200Z	22.1N	125.9E	35	22.0N	125.5E	40	23	5	24.7N	127.2E	35	237
171800Z	23.9N	127.2E	30	23.1N	126.4E	40	65	10	24.7N	127.2E	35	237
180000Z	26.1N	128.4E	25	26.1N	128.7E	30	5	5	24.7N	127.2E	35	237
180000Z	27.7N	130.1E	20	26.4N	129.1E	25	94	5	24.7N	127.2E	35	237

TROPICAL STORM FREDIA  
0000Z 21 JUN TO 1200Z 22 JUN

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		48 HOUR FORECAST		72 HOUR FORECAST	
	POSIT	WIND	POSIT	WIND	OST	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
210000Z	25.9N	151.5E	35	26.0N	151.7E	25	12	-10	26.0N	158.2E	30	61
210000Z	25.6N	153.0E	45	25.8N	153.0E	45	12	0	26.0N	160.0E	40	100
211200Z	25.2N	154.4E	40	25.0N	155.2E	40	25	0	24.3N	163.1E	30	182
211800Z	25.0N	156.8E	35	25.0N	156.8E	35	0	0	24.3N	163.1E	30	182
220000Z	25.2N	158.4E	35	25.3N	158.1E	35	44	0	24.3N	163.1E	30	182
220000Z	25.6N	161.8E	30	25.2N	160.9E	30	54	0	24.3N	163.1E	30	182
221200Z	26.6N	165.3E	25	25.3N	164.0E	30	104	5	24.3N	163.1E	30	182

TROPICAL STORM HARRIET  
0600Z 15 JUL TO 0600Z 18 JUL

	BEST TRACK		WARNING		ERRORS		24 HOUR FORECAST		48 HOUR FORECAST		72 HOUR FORECAST	
	POSIT	WIND	POSIT	WIND	OST	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
150000Z	18.2N	138.4E	35	18.0N	139.0E	35	13	0	21.4N	136.2E	30	103
151200Z	19.2N	137.7E	40	19.3N	138.1E	40	23	0	22.9N	135.4E	55	106
151800Z	20.2N	136.5E	45	20.0N	135.8E	30	41	-15	22.4N	130.9E	30	153
160000Z	21.2N	135.4E	45	21.0N	135.5E	40	13	-5	23.9N	132.0E	50	190
160000Z	22.2N	134.5E	40	22.1N	134.2E	40	18	0	25.4N	130.6E	30	127
161200Z	23.2N	133.5E	40	23.5N	133.8E	40	24	0	28.0N	131.9E	30	68
161800Z	24.3N	133.0E	35	24.2N	132.4E	35	33	0	28.0N	129.7E	25	222
170000Z	25.4N	132.4E	35	25.1N	132.8E	35	18	0	29.5N	131.8E	20	180
170000Z	26.6N	132.4E	30	26.9N	132.6E	30	21	0	32.5N	134.5E	20	230
171200Z	27.6N	133.1E	25	27.4N	132.9E	30	16	5	32.5N	134.5E	20	230
171800Z	28.4N	133.9E	25	28.6N	134.4E	30	35	5	32.5N	134.5E	20	230
180000Z	29.0N	135.2E	20	29.3N	135.2E	25	18	5	32.5N	134.5E	20	230
180000Z	29.1N	136.0E	20	29.3N	136.0E	20	33	0	32.5N	134.5E	20	230

TROPICAL STORM JEAN  
0000Z 17 JUL TO 0000Z 20 JUL

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
170000Z	19.7N 127.2E	25	19.6N 127.2E	30	0	5	22.5N 125.3E	40	85	0	---	---	---	---	---	---	---	---	---
170600Z	20.1N 126.8E	25	19.9N 126.7E	30	13	5	22.3N 124.8E	35	58	-5	---	---	---	---	---	---	---	---	---
171200Z	20.3N 126.3E	30	20.3N 126.3E	30	0	0	22.4N 124.7E	40	73	-5	---	---	---	---	---	---	---	---	---
171800Z	20.7N 125.7E	35	20.5N 126.0E	30	21	-5	22.4N 124.7E	35	102	-10	---	---	---	---	---	---	---	---	---
180000Z	21.1N 125.0E	40	21.4N 125.1E	35	19	-5	24.4N 124.0E	50	95	5	29.2N 125.7E	55	19	30	---	---	---	---	---
180600Z	21.5N 124.2E	40	21.8N 124.3E	45	19	5	25.4N 122.8E	50	45	20	---	---	---	---	---	---	---	---	---
181200Z	22.1N 123.5E	45	22.3N 123.7E	50	16	5	25.4N 122.0E	50	61	25	---	---	---	---	---	---	---	---	---
181800Z	22.9N 122.5E	45	22.9N 122.7E	50	11	5	26.5N 121.4E	45	104	15	---	---	---	---	---	---	---	---	---
190000Z	23.8N 122.5E	45	23.6N 122.4E	50	13	5	27.6N 122.2E	45	149	20	---	---	---	---	---	---	---	---	---
190600Z	25.0N 122.1E	40	24.9N 122.1E	55	6	15	---	---	---	---	---	---	---	---	---	---	---	---	---
191200Z	26.4N 121.8E	35	26.3N 122.2E	50	22	15	---	---	---	---	---	---	---	---	---	---	---	---	---
191800Z	28.2N 121.8E	30	28.3N 121.9E	45	8	15	---	---	---	---	---	---	---	---	---	---	---	---	---
200000Z	30.1N 122.1E	25	30.5N 122.2E	35	24	10	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM KIM  
0000Z 23 JUL TO 0000Z 24 JUL

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
230000Z	23.2N 166.0E	30	23.4N 167.2E	30	67	0	25.5N 168.3E	35	74	-10	---	---	---	---	---	---	---	---	---
230600Z	23.7N 166.0E	30	23.9N 166.3E	30	20	0	26.3N 168.1E	35	132	-15	---	---	---	---	---	---	---	---	---
231200Z	24.3N 167.2E	35	24.1N 168.1E	35	50	0	---	---	---	---	---	---	---	---	---	---	---	---	---
231800Z	25.2N 167.8E	40	24.2N 168.8E	35	81	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
240000Z	26.5N 167.5E	45	26.6N 167.3E	35	12	-10	---	---	---	---	---	---	---	---	---	---	---	---	---
240600Z	27.1N 165.8E	50	27.9N 166.1E	50	50	0	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM LUCY  
0000Z 09 AUG TO 0000Z 11 AUG

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
090000Z	18.5N 118.7E	25	18.1N 117.3E	30	83	5	19.7N 115.3E	40	270	5	---	---	---	---	---	---	---	---	---
090600Z	19.4N 119.2E	30	19.1N 119.1E	30	19	0	21.5N 118.9E	40	58	5	---	---	---	---	---	---	---	---	---
091200Z	20.5N 119.6E	35	20.2N 119.6E	35	21	0	23.3N 120.0E	45	50	10	---	---	---	---	---	---	---	---	---
091800Z	21.3N 119.5E	35	21.0N 120.1E	40	38	5	24.3N 119.4E	45	68	15	---	---	---	---	---	---	---	---	---
100000Z	22.1N 119.4E	35	22.5N 119.4E	40	24	5	26.3N 118.0E	20	170	-5	---	---	---	---	---	---	---	---	---
100600Z	22.4N 119.3E	35	23.2N 119.1E	40	49	5	26.4N 117.8E	20	142	-5	---	---	---	---	---	---	---	---	---
101200Z	22.9N 119.2E	35	24.0N 119.5E	35	68	0	---	---	---	---	---	---	---	---	---	---	---	---	---
101800Z	23.2N 119.1E	30	25.2N 119.5E	35	121	5	---	---	---	---	---	---	---	---	---	---	---	---	---
110000Z	23.6N 119.0E	25	23.7N 118.7E	30	17	5	---	---	---	---	---	---	---	---	---	---	---	---	---
110600Z	24.3N 118.8E	25	24.7N 119.0E	25	26	0	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL DEPRESSION 16  
0600Z 14 AUG TO 0600Z 15 AUG

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
140000Z	17.7N 110.8E	25	18.7N 110.5E	30	62	5	19.9N 107.2E	35	203	20	---	---	---	---	---	---	---	---	---
141200Z	17.5N 110.0E	25	19.1N 109.6E	30	98	5	---	---	---	---	---	---	---	---	---	---	---	---	---
141800Z	17.2N 109.2E	30	18.0N 109.9E	30	62	0	---	---	---	---	---	---	---	---	---	---	---	---	---
150000Z	16.9N 108.1E	30	16.9N 107.9E	30	11	0	---	---	---	---	---	---	---	---	---	---	---	---	---
150600Z	16.5N 107.0E	15	16.7N 106.9E	20	13	5	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM NADINE  
0600Z 15 AUG TO 1200Z 18 AUG

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
150000Z	16.0N 128.7E	35	16.5N 126.6E	30	124	-5	17.4N 124.4E	40	751	-10	---	---	---	---	---	---	---	---	---
151200Z	15.7N 130.8E	40	16.5N 129.0E	30	114	-10	16.5N 129.0E	30	600	-10	---	---	---	---	---	---	---	---	---
151800Z	15.5N 133.2E	45	15.5N 132.5E	30	40	-15	20.5N 138.4E	30	138	-15	---	---	---	---	---	---	---	---	---
160000Z	15.7N 135.7E	50	15.7N 135.7E	50	0	0	19.5N 141.6E	60	114	15	24.2N 142.3E	70	367	40	---	---	---	---	---
160600Z	16.6N 137.7E	50	16.7N 137.7E	50	6	0	22.4N 141.8E	60	66	20	27.0N 140.3E	70	265	45	---	---	---	---	---
161200Z	18.0N 139.4E	40	18.1N 139.6E	45	13	5	24.7N 141.4E	45	55	10	---	---	---	---	---	---	---	---	---
161800Z	19.7N 140.7E	45	19.4N 140.8E	45	19	0	26.3N 140.6E	35	92	5	---	---	---	---	---	---	---	---	---
170000Z	21.4N 141.5E	45	21.4N 141.5E	40	0	-5	28.1N 139.7E	30	125	0	---	---	---	---	---	---	---	---	---
170600Z	23.5N 141.7E	40	23.2N 141.7E	50	18	10	29.7N 138.8E	40	112	15	---	---	---	---	---	---	---	---	---
171200Z	25.6N 141.2E	35	24.5N 141.3E	40	66	5	---	---	---	---	---	---	---	---	---	---	---	---	---
171800Z	27.8N 141.0E	30	24.6N 140.4E	40	182	10	---	---	---	---	---	---	---	---	---	---	---	---	---
180000Z	30.1N 140.4E	30	30.0N 140.4E	30	6	0	---	---	---	---	---	---	---	---	---	---	---	---	---
180600Z	31.4N 139.7E	25	31.0N 139.8E	30	24	5	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL DEPRESSION 20  
0000Z 27 AUG TO 0600Z 28 AUG

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS
270000Z	24.6N 131.3E	30	24.7N 131.3E	30	6	0	27.7N 135.5E	40	334	15	---	---	---	---	---	---	---	---	---
270000Z	25.3N 131.6E	30	25.2N 132.5E	30	49	0	28.7N 136.0E	40	416	20	---	---	---	---	---	---	---	---	---
271000Z	25.9N 131.2E	30	25.1N 132.0E	30	64	0	---	---	---	---	---	---	---	---	---	---	---	---	---
271000Z	26.3N 130.4E	30	26.5N 131.3E	30	50	0	---	---	---	---	---	---	---	---	---	---	---	---	---
280000Z	26.8N 129.3E	25	27.0N 129.5E	25	16	0	---	---	---	---	---	---	---	---	---	---	---	---	---
280000Z	27.6N 128.2E	20	27.4N 128.7E	20	29	0	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM ROSE  
0600Z 28 AUG TO 0600Z 31 AUG

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS
280000Z	22.9N 124.8E	45	23.1N 124.8E	35	12	-10	26.4N 127.7E	45	102	-5	32.4N 128.8E	50	311	5	---	---	---	---	---
281000Z	23.3N 126.3E	45	23.4N 126.3E	40	6	-5	26.6N 129.9E	45	56	-5	30.6N 127.4E	35	273	-10	---	---	---	---	---
281000Z	23.9N 127.3E	45	24.0N 127.2E	40	8	-5	26.6N 128.5E	35	120	-15	---	---	---	---	---	---	---	---	---
290000Z	24.6N 128.0E	45	24.4N 127.6E	35	25	-10	25.7N 129.3E	30	97	-20	27.6N 133.3E	20	141	-15	---	---	---	---	---
290000Z	25.4N 128.0E	50	25.3N 128.6E	45	6	-5	28.4N 130.3E	45	96	0	33.6N 130.5E	25	534	-5	---	---	---	---	---
291000Z	26.3N 128.9E	50	25.9N 129.0E	50	24	0	29.1N 129.4E	45	152	0	---	---	---	---	---	---	---	---	---
291000Z	26.8N 128.7E	50	27.1N 129.0E	50	24	0	31.4N 127.8E	50	321	0	---	---	---	---	---	---	---	---	---
300000Z	27.2N 128.6E	50	27.3N 128.5E	50	8	0	30.6N 127.0E	45	395	10	---	---	---	---	---	---	---	---	---
300000Z	27.2N 129.1E	45	27.4N 128.5E	50	34	5	29.4N 127.1E	45	447	15	---	---	---	---	---	---	---	---	---
301000Z	26.6N 129.4E	45	26.6N 129.8E	40	5	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
301000Z	26.8N 130.4E	40	26.2N 130.8E	40	36	0	---	---	---	---	---	---	---	---	---	---	---	---	---
310000Z	25.6N 131.4E	35	25.7N 131.8E	30	8	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
310000Z	25.2N 134.0E	30	25.4N 133.7E	30	45	0	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM TRIX  
1200Z 04 SEP TO 1200Z 06 SEP

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS
051000Z	20.5N 114.7E	30	20.7N 114.5E	30	16	0	20.7N 112.2E	40	114	15	---	---	---	---	---	---	---	---	---
051000Z	20.7N 113.8E	35	20.7N 113.6E	30	11	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
060000Z	21.0N 113.0E	40	20.8N 113.0E	40	12	0	---	---	---	---	---	---	---	---	---	---	---	---	---
060000Z	21.6N 112.0E	40	21.3N 112.0E	35	18	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
061000Z	22.0N 110.7E	25	22.3N 110.8E	25	19	0	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM WENDY  
0600Z 24 SEP TO 0000Z 30 SEP

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST					
POSIT		WIND	POSIT	WIND	ERRORS		POSIT		WIND	ERRORS		POSIT		WIND	ERRORS		POSIT		WIND	ERRORS	
240000Z	17.7N 124.1E	30	17.7N 124.1E	25	0	-5	20.5N 120.5E	35	94	-5	---	---	---	---	---	---	---	---	---	---	---
241000Z	18.1N 123.2E	35	18.4N 123.0E	30	21	-5	20.6N 119.7E	45	125	5	---	---	---	---	---	---	---	---	---	---	---
241000Z	18.3N 122.4E	40	18.3N 122.6E	35	11	-5	20.6N 119.8E	50	71	10	21.6N 117.0E	55	206	5	23.3N 114.2E	30	439	-30	---	---	
250000Z	18.6N 121.6E	40	18.4N 122.0E	40	26	0	20.4N 119.0E	35	114	15	22.1N 115.9E	70	266	20	24.1N 113.2E	25	502	-35	---	---	
250000Z	19.0N 121.0E	40	19.2N 120.6E	40	26	0	20.5N 117.5E	60	183	15	22.3N 114.7E	75	358	20	24.5N 112.2E	25	548	-25	---	---	
251000Z	19.2N 121.0E	40	19.4N 120.4E	35	36	-5	20.4N 117.3E	35	190	5	21.3N 114.2E	65	416	5	22.3N 110.9E	25	614	-5	---	---	
251000Z	19.4N 120.4E	40	19.0N 120.4E	30	24	-10	19.6N 119.1E	50	103	0	---	---	---	---	---	---	---	---	---	---	
260000Z	19.6N 120.4E	40	19.5N 120.3E	30	29	-10	20.2N 119.2E	40	98	-10	---	---	---	---	---	---	---	---	---	---	
260000Z	19.9N 120.7E	45	20.0N 120.9E	30	13	-15	21.0N 120.0E	40	78	-15	---	---	---	---	---	---	---	---	---	---	
261000Z	20.3N 120.7E	50	20.3N 120.8E	45	6	-5	21.9N 119.7E	65	111	5	24.2N 117.2E	40	250	10	---	---	---	---	---	---	
261000Z	20.8N 120.6E	50	21.0N 120.3E	50	21	0	23.0N 118.8E	65	188	5	25.6N 116.1E	25	282	-5	---	---	---	---	---	---	
270000Z	21.2N 120.6E	50	21.2N 120.3E	50	17	0	23.1N 119.0E	60	195	0	25.7N 117.5E	30	191	0	---	---	---	---	---	---	
270000Z	21.8N 121.1E	55	21.6N 121.1E	60	12	5	24.7N 122.6E	65	68	15	26.0N 124.0E	70	180	45	---	---	---	---	---	---	
271000Z	22.5N 121.6E	60	22.2N 121.8E	60	21	0	24.6N 123.7E	70	110	40	27.2N 125.8E	65	284	40	---	---	---	---	---	---	
271000Z	23.4N 122.2E	60	23.5N 122.3E	60	8	0	27.1N 123.6E	70	172	40	29.7N 128.1E	65	449	45	---	---	---	---	---	---	
280000Z	24.1N 122.4E	60	24.0N 122.6E	60	12	0	26.6N 125.1E	70	240	40	29.3N 130.1E	55	525	35	---	---	---	---	---	---	
280000Z	24.8N 122.3E	60	25.0N 122.4E	60	13	10	28.5N 123.6E	60	259	35	---	---	---	---	---	---	---	---	---	---	
281000Z	25.1N 121.7E	60	25.1N 122.1E	60	22	30	27.8N 123.3E	55	184	30	---	---	---	---	---	---	---	---	---	---	
281000Z	25.1N 121.3E	30	25.3N 121.5E	30	16	20	27.3N 120.9E	55	96	35	---	---	---	---	---	---	---	---	---	---	
290000Z	25.2N 121.0E	30	25.0N 120.8E	35	16	5	26.0N 120.0E	30	48	10	---	---	---	---	---	---	---	---	---	---	
290000Z	24.9N 120.4E	25	25.0N 120.3E	35	33	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
291000Z	25.4N 120.4E	25	25.0N 120.4E	25	36	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
291000Z	25.7N 120.4E	20	25.4N 120.4E	25	32	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
300000Z	26.0N 120.4E	20	26.0N 121.0E	20	5	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	

TROPICAL STORM FAYE  
0600Z 01 NOV TO 0600Z 04 NOV

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
010000Z	13.1N 123.4E	25	13.0N 123.8E	30	6	5	13.0N 120.7E	35	175	-10	---	---	---	---	---	---	---	---	---
011000Z	13.3N 122.3E	30	13.2N 122.3E	30	6	0	13.4N 119.1E	40	153	-10	---	---	---	---	---	---	---	---	---
011000Z	13.5N 120.9E	35	13.5N 121.5E	30	35	-5	13.4N 118.2E	40	167	-15	---	---	---	---	---	---	---	---	---
020000Z	13.8N 119.4E	40	14.2N 119.8E	40	33	0	15.7N 115.7E	50	86	0	16.7N 112.3E	65	175	20	---	---	---	---	---
020000Z	14.1N 117.4E	45	14.0N 118.5E	45	35	0	14.7N 114.6E	50	91	0	15.6N 111.6E	50	164	20	---	---	---	---	---
021000Z	14.4N 116.6E	50	14.5N 116.5E	50	8	0	15.7N 112.0E	60	13	10	---	---	---	---	---	---	---	---	---
021000Z	14.6N 115.4E	55	14.4N 115.4E	50	12	-5	15.1N 111.0E	60	6	15	---	---	---	---	---	---	---	---	---
030000Z	14.8N 114.3E	55	14.7N 114.1E	50	13	-5	15.6N 109.3E	40	54	-5	---	---	---	---	---	---	---	---	---
030000Z	15.0N 113.7E	50	15.0N 112.6E	45	35	-5	15.5N 107.0E	20	86	-10	---	---	---	---	---	---	---	---	---
031000Z	15.0N 112.1E	50	15.1N 112.3E	45	13	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
031000Z	15.0N 111.0E	45	15.5N 111.0E	45	30	0	---	---	---	---	---	---	---	---	---	---	---	---	---
040000Z	14.9N 109.4E	45	14.8N 109.5E	35	24	-10	---	---	---	---	---	---	---	---	---	---	---	---	---
040000Z	15.0N 108.4E	30	14.6N 108.8E	30	33	0	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM HESTER  
1200Z 14 NOV TO 1200Z 15 NOV

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
141000Z	13.1N 114.2E	30	13.4N 114.0E	30	21	0	13.5N 107.9E	20	48	0	---	---	---	---	---	---	---	---	---
141000Z	13.1N 112.7E	35	13.4N 113.3E	30	39	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
150000Z	13.1N 111.3E	35	13.2N 111.1E	40	13	5	---	---	---	---	---	---	---	---	---	---	---	---	---
150000Z	12.9N 109.5E	35	13.2N 109.8E	40	25	5	---	---	---	---	---	---	---	---	---	---	---	---	---
151000Z	12.7N 107.8E	20	12.7N 108.0E	30	12	10	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM JUDY  
0000Z 18 DEC TO 0000Z 19 DEC

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
180000Z	13.2N 112.5E	30	15.0N 112.5E	30	108	0	15.8N 109.3E	25	213	-5	---	---	---	---	---	---	---	---	---
180000Z	12.8N 111.8E	35	13.0N 111.6E	30	17	-5	12.8N 108.4E	20	80	0	---	---	---	---	---	---	---	---	---
181000Z	12.5N 111.2E	40	12.4N 111.9E	30	41	-10	---	---	---	---	---	---	---	---	---	---	---	---	---
181000Z	12.4N 110.6E	40	12.2N 110.9E	40	21	0	---	---	---	---	---	---	---	---	---	---	---	---	---
190000Z	12.3N 110.0E	30	11.6N 109.5E	35	51	5	---	---	---	---	---	---	---	---	---	---	---	---	---
190000Z	12.0N 109.5E	20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TROPICAL STORM KIT  
0600Z 14 DEC TO 0600Z 24 DEC

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	ERRORS	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS	POSIT	WIND	ERRORS	ERRORS
190000Z	11.1N 132.2E	30	11.0N 132.0E	30	13	0	12.6N 126.3E	50	72	15	---	---	---	---	---	---	---	---	---
191000Z	11.3N 130.6E	35	11.6N 130.3E	35	25	0	13.3N 124.4E	50	119	20	14.4N 119.2E	35	187	10	15.0N 114.3E	45	318	20	---
191000Z	11.3N 129.2E	40	11.8N 128.8E	35	38	-5	13.7N 123.2E	45	139	20	15.4N 118.1E	40	269	15	15.6N 113.6E	45	365	15	---
200000Z	11.3N 127.8E	40	11.0N 127.3E	40	34	0	11.0N 122.4E	30	25	5	11.0N 116.5E	35	55	10	11.0N 112.5E	35	104	0	---
200000Z	11.4N 126.4E	35	11.0N 125.7E	40	47	5	11.0N 119.5E	35	85	10	11.0N 115.0E	35	80	10	11.0N 110.0E	35	155	-5	---
201000Z	11.4N 125.0E	30	10.6N 124.6E	35	53	5	10.4N 119.1E	35	59	10	10.5N 114.5E	35	51	10	10.5N 110.5E	35	87	-5	---
201000Z	11.4N 123.6E	25	10.6N 123.4E	30	49	5	10.4N 118.6E	35	27	10	---	---	---	---	---	---	---	---	---
210000Z	11.4N 122.3E	25	11.2N 122.7E	25	26	0	11.3N 117.8E	25	72	0	---	---	---	---	---	---	---	---	---
210000Z	11.4N 120.4E	25	11.3N 121.5E	25	36	0	11.3N 116.5E	20	85	-5	---	---	---	---	---	---	---	---	---
211000Z	11.3N 119.7E	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
211000Z	10.9N 118.4E	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
220000Z	10.3N 117.1E	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
220000Z	10.0N 115.4E	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
221000Z	9.7N 114.8E	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
221000Z	9.5N 113.8E	30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
230000Z	9.3N 112.4E	35	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
230000Z	9.2N 111.4E	40	9.3N 111.8E	35	8	-5	8.4N 107.8E	50	30	25	---	---	---	---	---	---	---	---	---
231000Z	9.1N 110.4E	40	9.5N 110.3E	45	43	5	---	---	---	---	---	---	---	---	---	---	---	---	---
231000Z	9.0N 110.0E	35	9.5N 109.3E	50	51	15	---	---	---	---	---	---	---	---	---	---	---	---	---
240000Z	9.0N 108.8E	30	9.2N 109.1E	35	21	5	---	---	---	---	---	---	---	---	---	---	---	---	---
240000Z	9.0N 107.5E	25	8.4N 106.9E	25	36	0	---	---	---	---	---	---	---	---	---	---	---	---	---

# 4. TYPHOON DATA

## TYPHOON CARLA

0000Z 02 MAY TO 0000Z 07 MAY

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
020000Z	12.4N 149.0E	30	11.9N 149.0E	30	30	0	14.2N 146.7E	45	6	0	---	---	---	---	---	---	---	---	---
020500Z	12.8N 148.0E	35	13.0N 149.0E	40	17	5	16.3N 145.7E	55	90	15	19.5N 144.3E	65	169	5	23.1N 144.0E	75	211	5	---
021000Z	13.1N 148.0E	40	12.9N 147.0E	45	17	5	13.8N 143.2E	65	146	25	15.7N 139.4E	75	253	10	18.0N 136.0E	80	460	5	---
021500Z	13.6N 147.4E	45	13.6N 147.4E	45	0	0	15.4N 144.2E	65	29	20	16.5N 141.8E	75	116	5	22.5N 141.3E	80	221	10	---
030000Z	14.2N 146.0E	45	14.2N 146.0E	50	6	5	16.5N 143.9E	65	25	10	19.5N 142.8E	75	70	-5	23.2N 144.3E	75	90	15	---
030500Z	14.8N 145.0E	40	14.6N 145.0E	50	12	10	17.1N 143.5E	65	33	5	20.2N 142.9E	75	54	-5	23.8N 144.7E	75	141	20	---
031000Z	15.3N 145.2E	40	15.5N 145.0E	45	17	5	18.8N 143.7E	60	90	-5	22.2N 145.4E	50	100	-25	25.5N 149.7E	35	100	-10	---
031500Z	15.7N 144.0E	45	16.0N 144.7E	45	19	0	19.4N 143.8E	60	96	-10	22.5N 145.7E	50	25	-20	25.5N 149.7E	35	152	-5	---
040000Z	16.2N 144.2E	55	16.3N 144.0E	50	13	-5	18.9N 142.1E	45	91	-35	22.4N 143.0E	40	176	-20	---	---	---	---	---
040500Z	16.7N 143.9E	60	16.4N 144.0E	60	19	0	18.1N 142.4E	75	124	-5	20.8N 142.1E	65	370	10	---	---	---	---	---
041000Z	17.3N 143.7E	65	17.3N 143.7E	65	0	0	19.8N 143.0E	75	99	0	23.1N 144.3E	65	301	20	---	---	---	---	---
041500Z	17.8N 143.7E	70	17.9N 143.6E	65	8	-5	20.5N 143.7E	70	190	0	23.5N 145.7E	60	362	20	---	---	---	---	---
050000Z	18.7N 143.7E	80	18.3N 143.7E	80	24	0	21.5N 144.4E	60	166	20	---	---	---	---	---	---	---	---	---
050500Z	19.7N 143.9E	80	19.6N 143.9E	85	8	5	23.4N 145.2E	75	132	20	---	---	---	---	---	---	---	---	---
051000Z	20.8N 144.4E	75	21.2N 144.2E	80	26	5	26.3N 147.8E	65	32	20	---	---	---	---	---	---	---	---	---
051500Z	22.3N 145.3E	70	21.9N 145.3E	70	24	0	26.5N 150.0E	50	90	10	---	---	---	---	---	---	---	---	---
060000Z	24.0N 145.7E	60	23.9N 146.2E	65	28	5	---	---	---	---	---	---	---	---	---	---	---	---	---
060500Z	25.4N 146.0E	55	25.4N 145.8E	60	43	5	---	---	---	---	---	---	---	---	---	---	---	---	---
061000Z	26.6N 148.3E	45	26.8N 147.7E	55	34	10	---	---	---	---	---	---	---	---	---	---	---	---	---
061500Z	28.0N 150.2E	40	28.0N 150.2E	50	0	10	---	---	---	---	---	---	---	---	---	---	---	---	---

## TYPHOONS WHILE WIND OVER 35KTS

WARNING	24-HR	48-HR	72-HR
17NM	87NM	182NM	146NM
11NM	38NM	75NM	136NM
4KTS	13KTS	13KTS	10KTS
3KTS	6KTS	-0KTS	4KTS
NUMBER OF FORECASTS	19	16	11

## ALL FORECASTS

WARNING	24-HR	48-HR	72-HR
17NM	87NM	182NM	146NM
12NM	38NM	75NM	136NM
4KTS	13KTS	13KTS	10KTS
3KTS	6KTS	-0KTS	4KTS
NUMBER OF FORECASTS	20	16	11

## TYPHOON DINAH

0000Z 08 JUN TO 0000Z 14 JUN

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
080000Z	12.9N 128.7E	40	13.0N 128.5E	45	13	5	14.7N 123.3E	65	107	10	17.1N 120.0E	50	166	-20	20.1N 117.3E	65	216	10	---
080500Z	13.2N 127.6E	45	13.0N 127.2E	60	26	15	14.0N 122.6E	70	100	10	16.4N 119.2E	50	127	-10	19.2N 116.5E	65	165	5	---
081000Z	13.6N 126.7E	50	13.7N 126.7E	55	6	5	15.6N 123.3E	70	61	5	18.1N 120.1E	50	97	0	21.2N 117.5E	65	247	0	---
081500Z	14.1N 125.9E	50	13.9N 126.1E	55	17	5	16.1N 122.6E	70	68	0	18.7N 119.5E	55	135	5	22.1N 117.2E	70	344	0	---
090000Z	14.3N 125.1E	55	14.4N 125.3E	55	13	0	17.2N 124.3E	65	108	-5	20.4N 120.4E	60	273	5	24.0N 118.5E	60	462	-10	---
090500Z	14.3N 124.3E	60	15.2N 124.4E	55	54	-5	18.4N 121.6E	55	132	-5	22.0N 119.9E	60	367	0	25.9N 119.3E	45	563	-25	---
091000Z	14.6N 123.5E	65	14.3N 123.4E	60	19	-5	15.1N 119.7E	55	84	5	17.8N 116.7E	70	93	5	21.4N 115.3E	70	213	0	---
091500Z	15.0N 122.9E	70	14.7N 122.5E	65	29	-5	16.4N 119.3E	55	42	5	18.7N 115.9E	70	130	5	21.8N 113.5E	70	167	0	---
100000Z	15.4N 122.3E	70	15.2N 122.4E	70	13	0	17.4N 119.8E	55	131	0	20.3N 117.9E	65	259	-5	23.3N 115.6E	65	357	5	---
100500Z	16.2N 121.4E	60	15.9N 121.5E	65	19	5	18.4N 118.5E	60	146	0	21.4N 116.5E	65	256	-5	24.7N 115.2E	50	443	-25	---
101000Z	16.5N 119.8E	50	16.6N 120.0E	55	21	5	19.8N 117.4E	65	217	0	22.9N 115.8E	70	300	0	26.4N 115.0E	50	550	-20	---
101500Z	16.6N 118.6E	50	17.9N 118.3E	60	80	10	21.7N 115.8E	70	298	5	26.3N 114.0E	30	438	-40	---	---	---	---	---
110000Z	16.5N 117.7E	55	16.6N 117.7E	55	6	0	18.3N 113.8E	70	58	0	21.1N 110.8E	65	81	5	---	---	---	---	---
110500Z	16.5N 116.9E	60	16.6N 116.7E	55	13	-5	17.8N 112.4E	70	71	0	20.7N 109.0E	55	42	0	---	---	---	---	---
111000Z	16.5N 115.8E	65	16.5N 116.3E	60	29	-5	17.8N 112.4E	70	62	0	20.5N 109.4E	50	84	0	---	---	---	---	---
111500Z	16.8N 114.8E	65	16.6N 115.0E	60	17	-5	17.4N 110.9E	70	126	0	20.4N 108.0E	50	77	0	---	---	---	---	---
120000Z	17.4N 114.2E	70	17.2N 113.1E	65	64	-5	19.7N 109.3E	50	62	-10	22.0N 107.4E	30	186	0	---	---	---	---	---
120500Z	18.1N 113.6E	70	17.7N 113.7E	70	25	0	20.1N 112.1E	65	174	10	22.7N 110.7E	30	361	10	---	---	---	---	---
121000Z	18.8N 112.7E	70	18.9N 113.0E	75	18	5	22.3N 111.6E	50	252	0	---	---	---	---	---	---	---	---	---
121500Z	19.5N 111.6E	70	20.0N 112.0E	70	37	0	23.0N 110.3E	25	269	-25	---	---	---	---	---	---	---	---	---
130000Z	19.8N 110.4E	60	20.8N 110.6E	65	61	5	---	---	---	---	---	---	---	---	---	---	---	---	---
130500Z	20.0N 109.0E	55	20.3N 109.1E	55	19	0	21.8N 104.0E	30	84	10	---	---	---	---	---	---	---	---	---
131000Z	20.0N 107.8E	50	20.5N 107.7E	45	30	-5	---	---	---	---	---	---	---	---	---	---	---	---	---
131500Z	20.0N 106.7E	50	20.4N 107.3E	40	41	-10	---	---	---	---	---	---	---	---	---	---	---	---	---
140000Z	20.1N 105.4E	50	20.8N 106.5E	35	74	5	---	---	---	---	---	---	---	---	---	---	---	---	---
140500Z	20.6N 104.4E	20	20.5N 104.4E	30	23	10	---	---	---	---	---	---	---	---	---	---	---	---	---

## TYPHOONS WHILE WIND OVER 35KTS

WARNING	24-HR	48-HR	72-HR
28NM	128NM	183NM	343NM
22NM	89NM	152NM	316NM
5KTS	5KTS	7KTS	10KTS
0KTS	0KTS	-3KTS	-5KTS
NUMBER OF FORECASTS	24	20	16

## ALL FORECASTS

WARNING	24-HR	48-HR	72-HR
29NM	126NM	193NM	343NM
23NM	86NM	159NM	316NM
5KTS	5KTS	6KTS	10KTS
1KTS	1KTS	-3KTS	-5KTS
NUMBER OF FORECASTS	26	21	18



TYPHOON GILDA  
0600Z 30 JUN TO 0000Z 07 JUL

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST					
POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND			
300000Z		19.5N 136.2E	30	21.0N 135.1E		30		140		0	25.7N 131.8E	40	358		-5		---		---	---	
301200Z		19.5N 135.4E	30	20.3N 134.9E		30		55		0	22.3N 131.6E	45	198		-5		---		---	---	
301800Z		19.5N 134.7E	35	19.9N 134.1E		40		41		5	20.3N 130.9E	50	132		-5		22.0N 128.0E		60	151 -10 24.4N 126.9E 80 82 -20	
010000Z		19.5N 134.2E	40	19.8N 134.1E		45		19		5	20.1N 131.7E	65	46		5		21.2N 129.0E		75	33 0 23.5N 126.7E 80 58 0	
010600Z		19.5N 133.8E	45	19.4N 133.6E		45		13		0	19.4N 131.7E	65	18		0		20.9N 129.1E		75	68 0 23.1N 126.5E 80 126 -5	
011200Z		19.5N 133.5E	50	19.4N 133.8E		50		18		0	19.7N 131.9E	65	59		-5		21.3N 129.0E		75	112 -5 23.7N 127.6E 80 138 -10	
011800Z		19.5N 133.1E	55	19.5N 133.2E		50		6		-5	20.7N 131.1E	65	45		-5		22.6N 128.0E		75	79 -5 25.1N 125.7E 80 105 -5	
020000Z		19.7N 132.4E	60	19.5N 132.4E		65		12		5	21.0N 129.3E	75	21		0		23.4N 126.7E		85	61 5 26.4N 125.5E 85 81 5	
020600Z		19.9N 131.7E	65	19.8N 131.6E		70		8		5	21.5N 128.7E	80	30		5		24.0N 126.5E		85	72 0 27.6N 125.0E 85 60 10	
021200Z		20.2N 131.0E	70	20.1N 130.8E		70		13		0	22.7N 128.1E	80	36		0		24.7N 126.6E		85	72 -5 28.5N 125.0E 85 57 10	
021800Z		20.6N 130.3E	70	20.6N 130.1E		75		16		5	23.4N 127.7E	85	19		5		26.7N 126.0E		85	12 0 29.6N 127.1E 85 54 10	
030000Z		21.2N 129.6E	75	21.1N 129.8E		80		13		5	23.9N 127.8E	90	48		10		27.5N 127.6E		80	53 0 30.5N 129.0E 85 141 -5	
030600Z		22.0N 128.8E	75	21.6N 128.9E		85		13		10	24.4N 127.1E	95	36		10		28.4N 127.4E		85	58 10 31.7N 131.0E 85 187 0	
031200Z		22.8N 128.2E	80	23.0N 128.0E		90		16		10	26.4N 126.9E	95	50		5		30.4N 128.0E		75	106 0 34.1N 131.0E 45 187 -10	
031800Z		23.7N 127.6E	80	23.6N 127.7E		90		8		10	26.4N 126.8E	95	32		10		30.7N 128.6E		75	84 0 34.5N 131.0E 45 123 -5	
040000Z		24.4N 127.1E	80	24.4N 127.2E		90		5		10	27.7N 126.3E	85	8		5		31.5N 127.7E		65	41 -5 34.8N 132.2E 40 132 0	
040600Z		25.2N 126.6E	85	25.3N 126.7E		90		8		5	28.7N 125.0E	80	41		5		32.5N 127.0E		60	24 -5 --- --- ---	
041200Z		25.9N 126.4E	90	25.9N 126.7E		90		16		0	29.7N 126.8E	75	32		0		34.1N 128.9E		50	53 -5 --- --- ---	
041800Z		26.8N 126.2E	95	26.7N 126.4E		95		12		10	30.7N 126.5E	75	13		0		34.7N 128.4E		50	10 0 --- --- ---	
050000Z		27.6N 126.2E	90	27.5N 126.3E		90		8		10	31.0N 126.4E	65	30		-5		34.9N 130.1E		40	84 0 --- --- ---	
050600Z		28.4N 126.3E	95	28.4N 126.2E		95		5		10	32.1N 127.4E	65	36		-10		---		---	---	---
051200Z		29.3N 126.4E	75	29.4N 126.7E		75		17		0	34.2N 129.4E	50	99		-5		---		---	---	---
051800Z		30.4N 126.6E	75	30.6N 127.4E		70		43		-5	34.4N 131.0E	45	98		-5		---		---	---	---
060000Z		31.5N 126.9E	70	31.7N 126.6E		70		19		0	36.7N 128.2E	35	99		-5		---		---	---	---
060600Z		32.7N 127.5E	65	32.6N 127.1E		65		21		0	---	---					---		---	---	---
061200Z		33.5N 128.1E	60	33.6N 128.1E		60		6		5	---	---					---		---	---	---
061800Z		34.7N 129.0E	50	34.5N 128.9E		55		13		5	---	---					---		---	---	---
070000Z		36.3N 130.2E	40	36.4N 130.2E		45		6		5	---	---					---		---	---	---

TYPHOONS WHILE WIND OVER 75KTS				ALL FORECASTS			
WARNING	24-HR	48-HR	72-HR	WARNING	24-HR	48-HR	72-HR
14NM	66NM	65NM	109NM	20NM	66NM	65NM	109NM
10NM	42NM	34NM	75NM	15NM	42NM	34NM	75NM
5KTS	5KTS	3KTS	7KTS	5KTS	5KTS	3KTS	7KTS
4KTS	4KTS	1KTS	2KTS	4KTS	4KTS	1KTS	2KTS
NUMBER OF FORECASTS	26	24	18	14	28	24	18

TYPHOON IVY  
0600Z 17 JUL TO 0000Z 22 JUL

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST					
POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND			
170000Z	11.8N 139.4E	30		11.9N 139.5E	30			8	0	12.4N 135.1E	50	168	-5	---	---	---	---	---	---		
171200Z	12.3N 137.7E	30		12.1N 138.2E	30			32	0	13.7N 133.9E	45	182	-15	---	---	---	---	---	---		
171800Z	12.8N 135.4E	40		12.7N 135.7E	30			13	-10	14.3N 131.3E	45	110	-20	---	---	---	---	---	---		
180000Z	13.3N 134.1E	45		13.3N 134.4E	45			17	0	15.9N 129.8E	65	136	-10	18.7N 126.7E	75	129	-15	22.4N 124.4E	85	508	15
180600Z	13.8N 132.4E	55		13.5N 132.5E	55			19	0	16.0N 127.5E	75	100	-10	19.2N 124.3E	85	280	20	22.8N 122.3E	90	462	15
181200Z	14.1N 130.9E	60		14.2N 130.8E	60			8	0	17.4N 126.5E	80	175	-10	21.1N 123.7E	90	362	30	24.7N 122.2E	95	546	15
181800Z	14.4N 129.4E	65		14.6N 129.6E	65			17	0	17.4N 125.8E	85	204	-5	21.2N 123.9E	95	393	30	25.0N 122.3E	95	579	10
190000Z	14.7N 127.8E	75		14.8N 127.7E	75			8	0	17.5N 123.2E	100	138	10	21.3N 120.9E	85	116	15	25.5N 120.2E	45	515	-45
190600Z	14.8N 126.3E	85		15.2N 126.0E	90			30	5	18.2N 120.9E	65	137	0	21.9N 118.4E	70	258	-5	26.0N 117.5E	25	429	-70
191200Z	15.0N 125.1E	90		15.0N 125.1E	100			0	10	16.7N 120.2E	70	51	10	19.5N 117.3E	85	161	5	22.8N 115.2E	90	227	30
191800Z	15.2N 123.5E	90		15.2N 123.7E	100			12	10	17.1N 119.1E	70	71	5	20.0N 116.0E	90	137	5	---	---	---	---
200000Z	15.5N 122.0E	90		15.6N 122.0E	100			6	10	17.9N 117.2E	75	29	5	20.8N 114.3E	90	89	0	---	---	---	---
200600Z	15.9N 120.8E	85		15.9N 121.1E	80			17	15	17.8N 117.0E	80	92	5	20.3N 113.9E	85	89	-10	---	---	---	---
201200Z	16.7N 119.3E	80		16.6N 119.4E	65			19	5	19.0N 115.2E	80	40	0	22.0N 112.3E	75	60	15	---	---	---	---
201800Z	17.4N 117.9E	85		17.7N 117.9E	70			18	5	21.5N 114.1E	85	117	0	---	---	---	---	---	---	---	---
210000Z	17.8N 116.7E	70		17.8N 116.6E	70			6	0	20.4N 112.4E	85	55	-5	---	---	---	---	---	---	---	---
210600Z	18.4N 115.5E	75		18.2N 115.4E	75			13	0	21.4N 111.6E	85	45	-10	---	---	---	---	---	---	---	---
211200Z	19.0N 114.5E	80		19.2N 114.6E	80			13	0	22.8N 111.4E	35	72	-25	---	---	---	---	---	---	---	---
211800Z	19.6N 113.6E	85		19.6N 113.6E	85			0	0	---	---	---	---	---	---	---	---	---	---	---	---
220000Z	20.1N 112.4E	90		20.2N 112.8E	85			8	-5	---	---	---	---	---	---	---	---	---	---	---	---
220600Z	20.8N 112.1E	95		20.7N 112.1E	90			6	-5	---	---	---	---	---	---	---	---	---	---	---	---
221200Z	21.6N 111.3E	80		21.6N 111.6E	85			17	25	---	---	---	---	---	---	---	---	---	---	---	---

TYPHOONS WHILE WIND OVER 75KTS				ALL FORECASTS			
WARNING	24-HR	48-HR	72-HR	WARNING	24-HR	48-HR	72-HR
12NM	107NM	225NM	465NM	13NM	107NM	225NM	465NM
10NM	61NM	190NM	422NM	10NM	61NM	190NM	422NM
5KTS	8KTS	14KTS	29KTS	5KTS	8KTS	14KTS	29KTS
3KTS	4KTS	8KTS	4KTS	3KTS	4KTS	8KTS	4KTS
NUMBER OF FORECASTS	20	18	11	7	22	18	11

TYPHOON MARY  
0600Z 11 AUG TO 0600Z 26 AUG

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS
110000Z	15.7N 150.0E	30 15.6N 151.2E	30	35 0	16.0N 148.6E	50	257 5	---	---	---	---	---	---	---	---	---	---	---	---
111000Z	16.3N 151.2E	30 15.7N 150.7E	30	46 0	15.4N 148.3E	45	255 0	---	---	---	---	---	---	---	---	---	---	---	---
111000Z	16.9N 151.8E	35 16.3N 149.7E	30	125 -5	17.3N 146.7E	45	240 -5	---	---	---	---	---	---	---	---	---	---	---	---
120000Z	17.7N 152.3E	40 17.5N 153.1E	40	47 0	18.7N 150.8E	60	128 10	20.3N 147.4E	85	230 35	21.5N 143.2E	110	306 55	22.2N 147.7E	85	242 30	24.0N 143.0E	110	191 55
120000Z	18.6N 152.2E	45 18.4N 153.5E	45	75 0	20.2N 151.1E	65	139 15	22.2N 147.7E	85	242 30	24.0N 143.0E	110	191 55	24.7N 144.2E	90	57 35	25.7N 138.9E	110	116 55
121000Z	19.3N 151.0E	45 19.4N 151.6E	45	49 0	22.4N 148.1E	65	71 15	24.7N 144.2E	90	57 35	25.7N 138.9E	110	116 55	25.1N 142.6E	90	48 35	25.8N 137.3E	110	129 55
121000Z	19.8N 149.8E	50 20.7N 150.4E	50	63 0	23.5N 146.6E	70	51 20	25.1N 142.6E	90	48 35	25.8N 137.3E	110	129 55	26.0N 141.5E	60	132 5	28.5N 134.4E	50	211 0
130000Z	20.3N 149.3E	50 22.7N 151.4E	60	185 10	25.6N 147.1E	80	166 30	28.5N 143.9E	100	156 45	31.6N 142.5E	110	354 55	26.8N 141.5E	70	11 15	29.5N 134.9E	65	180 10
130000Z	20.8N 148.7E	50 20.8N 147.9E	55	45 5	23.9N 144.5E	65	40 10	26.8N 141.5E	70	11 15	29.5N 134.9E	65	180 10	26.3N 141.6E	65	53 10	28.7N 134.8E	60	129 10
131000Z	21.8N 147.0E	50 21.6N 147.6E	50	12 0	24.2N 144.1E	55	74 0	26.3N 141.6E	65	53 10	28.7N 134.8E	60	129 10	26.0N 141.5E	60	132 5	28.5N 134.4E	50	211 0
131000Z	22.7N 146.3E	50 21.4N 147.0E	50	87 0	23.4N 144.1E	55	168 0	26.0N 141.5E	60	132 5	28.5N 134.4E	50	211 0	26.0N 141.5E	60	132 5	28.5N 134.4E	50	211 0
140000Z	23.5N 145.1E	50 22.5N 146.6E	50	102 0	25.7N 144.2E	55	127 0	28.3N 141.6E	60	196 5	30.4N 138.7E	50	278 -5	24.4N 144.0E	55	24.5N 135.6E	50	290 -30	
140000Z	24.4N 144.0E	55 24.5N 144.4E	50	23 -5	29.1N 141.5E	55	138 0	32.8N 138.2E	55	335 0	34.5N 135.6E	50	290 -30	25.2N 143.3E	55	25.0N 143.7E	55	25 0	
141000Z	25.2N 143.3E	55 25.0N 143.7E	55	25 0	27.7N 141.6E	65	72 10	30.5N 139.9E	75	241 25	33.5N 138.6E	70	444 10	25.9N 142.7E	55	25.7N 143.1E	55	25 0	
141000Z	25.9N 142.7E	55 25.7N 143.1E	55	25 0	28.5N 141.3E	65	139 10	31.4N 140.2E	75	324 25	34.4N 139.8E	70	570 10	26.5N 140.5E	40	495 -15	38.2N 145.9E	30	974 -35
150000Z	26.5N 142.0E	55 26.7N 142.3E	50	20 -5	30.3N 140.5E	45	231 -10	34.2N 140.5E	40	495 -15	38.2N 145.9E	30	974 -35	27.2N 141.4E	50	24 -5	30.3N 139.5E	40	488 -20
150000Z	26.8N 141.3E	55 27.2N 141.4E	50	24 -5	30.3N 139.5E	45	208 -10	34.0N 139.3E	40	488 -20	38.2N 145.9E	30	974 -35	27.0N 140.9E	55	8 0	28.6N 137.5E	60	302 0
151000Z	27.0N 140.9E	55 26.9N 140.4E	55	8 0	28.6N 137.5E	60	73 10	32.1N 136.3E	60	302 0	35.9N 136.7E	30	647 -35	27.1N 139.3E	55	6 -6	28.4N 135.6E	60	42 10
151000Z	27.0N 139.3E	55 27.1N 139.3E	55	6 0	28.4N 135.6E	60	42 10	31.0N 133.9E	60	242 0	34.8N 134.7E	30	608 -30	27.0N 139.3E	55	6 -6	28.4N 135.6E	60	42 10
160000Z	27.0N 138.2E	55 27.0N 138.1E	55	5 0	28.3N 134.1E	60	24 5	31.7N 131.8E	55	207 -10	---	---	---	---	---	---	---	---	---
160000Z	27.2N 137.7E	55 27.2N 137.2E	50	27 -5	29.0N 133.3E	50	42 -10	32.3N 131.0E	30	240 -40	---	---	---	---	---	---	---	---	---
161000Z	27.6N 136.7E	50 27.9N 136.5E	50	21 0	30.6N 133.2E	45	139 -15	33.9N 130.8E	25	363 -40	---	---	---	---	---	---	---	---	---
161000Z	27.7N 135.5E	50 27.9N 135.1E	50	24 0	30.3N 131.7E	45	122 -15	33.9N 129.7E	25	385 -35	---	---	---	---	---	---	---	---	---
170000Z	27.9N 134.2E	55 27.7N 134.6E	45	24 -10	29.5N 130.2E	35	55 -30	32.4N 126.6E	30	250 -25	---	---	---	---	---	---	---	---	---
170000Z	28.3N 133.2E	60 28.2N 133.1E	45	8 -15	30.8N 129.2E	35	119 -35	33.9N 125.6E	30	322 -20	---	---	---	---	---	---	---	---	---
171000Z	28.4N 132.3E	60 28.6N 132.1E	55	16 -5	30.4N 128.1E	65	114 0	33.0N 123.8E	45	245 0	---	---	---	---	---	---	---	---	---
171000Z	28.3N 131.2E	60 28.4N 131.4E	55	37 -5	30.9N 127.4E	65	172 5	---	---	---	---	---	---	---	---	---	---	---	---
180000Z	28.6N 130.0E	65 28.6N 129.9E	60	5 -5	30.5N 125.5E	60	125 5	---	---	---	---	---	---	---	---	---	---	---	---
180000Z	28.9N 128.5E	70 29.2N 128.6E	65	19 -5	31.6N 123.5E	55	155 5	---	---	---	---	---	---	---	---	---	---	---	---
181000Z	28.7N 127.1E	65 29.2N 127.0E	65	30 0	31.3N 121.4E	30	114 -15	---	---	---	---	---	---	---	---	---	---	---	---
181000Z	28.6N 125.4E	60 28.8N 125.4E	55	12 -5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
190000Z	28.8N 124.1E	55 28.8N 124.2E	50	5 -5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
190000Z	29.1N 122.7E	50 29.1N 123.0E	50	16 0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
191000Z	29.4N 121.5E	45 29.4N 121.4E	40	5 -5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
230000Z	27.2N 125.3E	25 27.3N 125.0E	25	17 0	29.2N 129.7E	35	181 -15	---	---	---	---	---	---	---	---	---	---	---	---
231000Z	27.6N 126.1E	25 27.6N 126.2E	25	5 0	30.0N 130.1E	35	239 -20	---	---	---	---	---	---	---	---	---	---	---	---
231000Z	27.1N 126.6E	30 27.7N 127.0E	25	37 -5	29.9N 130.4E	35	232 -25	---	---	---	---	---	---	---	---	---	---	---	---
240000Z	26.8N 127.4E	45 26.7N 127.3E	45	8 0	27.6N 131.3E	60	88 -10	31.2N 135.4E	70	226 20	---	---	---	---	---	---	---	---	---
240000Z	26.3N 128.7E	50 26.4N 128.3E	45	22 -5	27.3N 132.2E	60	114 -10	---	---	---	---	---	---	---	---	---	---	---	---
241000Z	26.0N 130.0E	55 26.2N 129.7E	55	20 0	27.9N 134.6E	65	123 0	---	---	---	---	---	---	---	---	---	---	---	---
241000Z	26.1N 131.3E	60 26.0N 131.4E	55	8 -5	28.8N 136.1E	65	199 10	---	---	---	---	---	---	---	---	---	---	---	---
250000Z	26.8N 132.7E	70 26.5N 132.5E	65	21 -5	30.2N 136.5E	70	263 20	---	---	---	---	---	---	---	---	---	---	---	---
250000Z	28.0N 134.2E	70 27.7N 133.8E	65	28 -5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
251000Z	29.8N 135.5E	65 29.6N 135.5E	65	12 0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
251000Z	32.1N 136.6E	55 31.9N 136.9E	55	19 0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
260000Z	34.5N 137.6E	50 34.4N 137.2E	55	21 5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TYPHOONS WHILE WIND OVER 75KTS					ALL FORECASTS				
WARNING					WARNING				
AVERAGE FORECAST ERROR					24-HR 48-HR 72-HR				
AVERAGE RIGHT ANGLE ERROR					32NM 138NM 242NM 368NM				
AVERAGE MAGNITUDE OF WIND ERROR					23NM 98NM 186NM 267NM				
AVERAGE BIAS OF WIND ERROR					3KTS 11KTS 20KTS 30KTS				
NUMBER OF FORECASTS					-2KTS -1KTS 3KTS 12KTS				
					46 38 24 15				

TYPHOON POLLY  
1200Z 24 AUG TO 0000Z 02 SEP

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT		WIND		POSIT		WIND		ERRORS		ERRORS		ERRORS		ERRORS		ERRORS			
251200Z	16.4N 148.7E	25	14.7N 148.7E	30	14.7N 148.7E	30	14.7N 148.7E	18	5	17.7N 143.8E	40	177	0	---	---	---	---		
251600Z	15.8N 147.7E	25	14.6N 147.3E	30	14.6N 147.3E	30	14.6N 147.3E	53	5	17.4N 142.2E	40	253	0	---	---	---	---		
260000Z	15.6N 146.5E	30	15.7N 146.6E	30	15.7N 146.6E	30	15.7N 146.6E	8	0	15.8N 142.2E	45	230	-10	---	---	---	---		
260600Z	15.5N 146.6E	30	15.2N 146.7E	30	15.2N 146.7E	30	15.2N 146.7E	19	0	14.8N 143.6E	45	162	-15	---	---	---	---		
261200Z	15.6N 146.4E	40	15.2N 146.2E	40	15.2N 146.2E	40	15.2N 146.2E	27	0	14.6N 144.3E	60	188	-10	14.5N 140.9E	75	433	-15		
261800Z	15.8N 146.3E	40	15.6N 146.2E	45	15.6N 146.2E	45	15.6N 146.2E	13	5	15.8N 144.1E	65	179	-10	16.1N 140.7E	80	397	-15		
270000Z	16.2N 146.0E	55	16.2N 146.0E	55	16.2N 146.0E	55	16.2N 146.0E	0	0	17.7N 143.9E	75	159	-5	18.4N 140.8E	85	317	-10		
270600Z	16.7N 145.6E	60	16.8N 145.5E	60	16.8N 145.5E	60	16.8N 145.5E	8	0	18.8N 143.2E	80	120	-5	20.7N 140.4E	90	261	-5		
271200Z	17.7N 144.9E	70	17.3N 144.1E	65	17.3N 144.1E	65	17.3N 144.1E	26	-5	19.2N 142.7E	85	158	-5	21.1N 139.9E	95	307	5		
271800Z	18.8N 144.2E	75	18.3N 144.3E	65	18.3N 144.3E	65	18.3N 144.3E	30	-10	20.9N 142.0E	85	111	-10	24.0N 139.4E	95	204	10		
280000Z	19.8N 143.3E	80	19.8N 143.5E	75	19.8N 143.5E	75	19.8N 143.5E	11	-5	23.4N 140.3E	95	52	0	26.2N 137.2E	105	202	25		
280600Z	20.7N 142.5E	85	20.7N 142.4E	80	20.7N 142.4E	80	20.7N 142.4E	6	-5	24.6N 138.6E	100	153	5	26.5N 134.8E	105	299	25		
281200Z	21.7N 141.8E	90	21.6N 142.0E	90	21.6N 142.0E	90	21.6N 142.0E	13	0	25.3N 136.6E	110	148	20	28.3N 135.0E	110	211	25		
281800Z	22.7N 141.5E	95	22.6N 140.9E	95	22.6N 140.9E	95	22.6N 140.9E	34	0	25.9N 137.2E	115	205	30	29.2N 133.4E	115	224	30		
290000Z	23.7N 141.2E	95	23.7N 141.1E	95	23.7N 141.1E	95	23.7N 141.1E	5	0	28.0N 140.0E	110	24	30	32.2N 137.8E	90	104	5		
290600Z	25.0N 141.2E	95	25.2N 140.2E	95	25.2N 140.2E	95	25.2N 140.2E	55	0	30.2N 138.4E	105	78	25	35.3N 137.2E	60	274	-30		
291200Z	26.1N 141.2E	90	25.9N 141.1E	95	25.9N 141.1E	95	25.9N 141.1E	13	5	30.5N 140.9E	90	124	5	35.4N 141.9E	70	444	-20		
291800Z	27.3N 140.7E	85	27.3N 140.8E	95	27.3N 140.8E	95	27.3N 140.8E	5	10	32.2N 140.5E	85	183	0	37.2N 144.6E	65	634	-20		
300000Z	28.4N 140.1E	80	28.4N 140.2E	85	28.4N 140.2E	85	28.4N 140.2E	5	5	33.9N 140.1E	70	256	-15	39.5N 144.3E	45	693	-40		
300600Z	29.3N 139.5E	80	29.3N 139.6E	80	29.3N 139.6E	80	29.3N 139.6E	5	0	34.7N 137.3E	65	218	-25	40.6N 138.0E	35	330	-45		
301200Z	29.9N 138.8E	85	30.1N 138.8E	80	30.1N 138.8E	80	30.1N 138.8E	16	-5	33.8N 136.2E	65	189	-25	38.9N 133.9E	35	296	-25		
301800Z	30.4N 137.8E	85	30.7N 137.3E	80	30.7N 137.3E	80	30.7N 137.3E	24	-5	33.9N 133.2E	50	166	-35	38.9N 130.8E	30	189	-20		
310000Z	30.8N 136.8E	85	30.9N 136.8E	80	30.9N 136.8E	80	30.9N 136.8E	12	-5	33.3N 133.0E	50	95	-35	38.0N 131.6E	30	46	-15		
310600Z	30.8N 135.7E	90	31.0N 135.6E	75	31.0N 135.6E	75	31.0N 135.6E	13	-15	32.7N 131.2E	45	116	-35	---	---	---	---		
311200Z	30.9N 134.7E	90	30.9N 134.8E	90	30.9N 134.8E	90	30.9N 134.8E	5	0	31.6N 130.9E	60	178	0	---	---	---	---		
311800Z	31.2N 134.7E	85	31.0N 133.9E	90	31.0N 133.9E	90	31.0N 133.9E	13	5	31.8N 130.4E	55	270	5	---	---	---	---		
010000Z	31.8N 133.6E	85	31.7N 133.5E	85	31.7N 133.5E	85	31.7N 133.5E	8	0	35.4N 132.3E	45	138	0	---	---	---	---		
010600Z	32.5N 133.5E	80	32.3N 133.2E	85	32.3N 133.2E	85	32.3N 133.2E	19	5	---	---	---	---	---	---	---	---		
011200Z	34.0N 133.0E	60	34.0N 133.1E	55	34.0N 133.1E	55	34.0N 133.1E	5	-5	---	---	---	---	---	---	---	---		
011800Z	36.0N 132.4E	50	36.3N 132.3E	50	36.3N 132.3E	50	36.3N 132.3E	19	0	---	---	---	---	---	---	---	---		
020000Z	37.7N 132.5E	45	38.1N 132.5E	45	38.1N 132.5E	45	38.1N 132.5E	24	0	---	---	---	---	---	---	---	---		

TYPHOONS WHILE WIND OVER 75KTS

AVERAGE FORECAST ERROR	15NM	16NM	320NM	367NM
AVERAGE RIGHT ANGLE ERROR	12NM	106NM	215NM	233NM
AVERAGE MAGNITUDE OF WIND ERROR	-4KTS	13KTS	20KTS	17KTS
AVERAGE BIAS OF WIND ERROR	-1KTS	-4KTS	-7KTS	1KTS
NUMBER OF FORECASTS	27	27	19	11

ALL FORECASTS

WARNING	24-HR	48-HR	72-HR
17NM	16NM	320NM	367NM
13NM	106NM	215NM	233NM
3KTS	13KTS	20KTS	17KTS
-0KTS	-4KTS	-7KTS	1KTS
31	27	19	11

TYPHOON SHIRLEY

0000Z 04 SEP TO 0000Z 09 SEP

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT		WIND		POSIT		WIND		ERRORS		EMRCLS		ERRORS		EMRCLS		ERRORS		EMRCLS	
040000Z	24.4N 130.8E	25	24.4N 130.8E	25	0	25.4N 132.7E	30	87	-20	---	---	---	---	---	---	---	---	---	---
040600Z	24.8N 130.9E	30	25.0N 131.2E	25	20	-5	27.2N 133.6E	30	161	-20	---	---	---	---	---	---	---	---	---
041200Z	25.2N 131.1E	35	25.3N 131.6E	25	28	-10	27.4N 133.6E	30	166	-25	---	---	---	---	---	---	---	---	---
041800Z	25.5N 131.1E	45	25.7N 131.6E	40	29	-5	27.7N 132.8E	50	150	-5	30.2N 134.4E	50	366	-20	32.9N 137.2E	45	538	-25	
050000Z	25.8N 131.1E	50	25.6N 131.3E	40	16	-10	27.7N 131.6E	50	107	-10	30.6N 133.5E	50	332	-25	33.6N 136.7E	45	492	-20	
050600Z	26.2N 130.8E	50	26.4N 131.3E	45	29	-5	28.7N 132.2E	60	185	-5	31.7N 134.4E	55	400	-20	34.2N 137.8E	45	488	-20	
051200Z	26.4N 130.7E	55	26.4N 131.0E	60	16	5	27.6N 131.0E	65	133	0	31.2N 134.5E	55	387	-20	35.5N 143.8E	40	713	-20	
051800Z	26.7N 130.2E	55	26.7N 130.5E	60	16	5	26.0N 130.0E	65	147	-5	28.5N 132.5E	60	269	-10	31.8N 134.8E	50	372	5	
060000Z	26.9N 129.8E	60	26.8N 129.6E	60	12	0	26.4N 129.9E	65	151	-10	29.0N 132.5E	55	234	-10	---	---	---	---	
060600Z	27.1N 129.2E	65	27.1N 129.0E	65	11	0	28.4N 128.5E	70	53	-5	31.1N 131.4E	55	122	-10	---	---	---	---	
061200Z	27.4N 128.5E	65	27.3N 128.4E	65	8	0	29.3N 128.2E	70	44	-5	32.2N 132.7E	55	129	-5	---	---	---	---	
061800Z	27.7N 128.0E	70	27.7N 128.0E	70	0	0	29.8N 129.8E	60	120	-10	32.7N 135.3E	50	156	5	---	---	---	---	
070000Z	28.1N 127.8E	75	28.1N 127.9E	65	5	-10	31.1N 129.7E	55	113	-10	---	---	---	---	---	---	---	---	
070600Z	28.5N 127.6E	75	28.7N 127.4E	65	16	-10	31.8N 128.7E	55	75	-10	---	---	---	---	---	---	---	---	
071200Z	28.9N 127.5E	75	29.0N 127.6E	70	8	-5	31.7N 129.8E	55	28	-5	---	---	---	---	---	---	---	---	
071800Z	29.2N 127.9E	70	29.2N 127.6E	70	0	0	31.8N 129.5E	55	145	10	---	---	---	---	---	---	---	---	
080000Z	29.8N 128.1E	65	29.8N 128.1E	70	0	5	---	---	---	---	---	---	---	---	---	---	---	---	
080600Z	30.6N 129.1E	65	30.9N 129.1E	70	18	5	---	---	---	---	---	---	---	---	---	---	---	---	
081200Z	31.5N 130.3E	60	31.5N 130.1E	60	10	0	---	---	---	---	---	---	---	---	---	---	---	---	
081800Z	32.6N 132.2E	45	33.2N 132.2E	40	36	-5	---	---	---	---	---	---	---	---	---	---	---	---	

TYPHOONS WHILE WIND OVER 75KTS

AVERAGE FORECAST ERROR	14NM	116NM	265NM	521NM
AVERAGE RIGHT ANGLE ERROR	11NM	75NM	137NM	350NM
AVERAGE MAGNITUDE OF WIND ERROR	4KTS	10KTS	14KTS	18KTS
AVERAGE BIAS OF WIND ERROR	-2KTS	-8KTS	-13KTS	-16KTS
NUMBER OF FORECASTS	18	16	9	5

# TYPHOON VIRGINIA

1200Z 12 SEP TO 0000Z 16 SEP

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND
121200Z	30.5N 150.4E	45	30.6N 150.8E	30	8	-15	34.4N 156.1E	35	113	-30	---	---	---	---	---	---	---	---	---
121800Z	31.4N 151.0E	55	31.4N 151.7E	30	5	-25	35.0N 157.4E	35	138	-35	---	---	---	---	---	---	---	---	---
130000Z	32.2N 152.4E	65	32.3N 152.6E	65	12	0	36.2N 158.8E	55	108	-15	40.5N 169.0E	40	640	-25	---	---	---	---	---
130600Z	33.1N 153.2E	65	33.1N 153.3E	65	5	0	37.4N 159.7E	50	190	-25	---	---	---	---	---	---	---	---	---
131200Z	33.9N 153.9E	65	33.9N 154.0E	65	5	0	37.5N 158.2E	50	91	-25	---	---	---	---	---	---	---	---	---
131800Z	34.8N 154.6E	70	34.8N 154.6E	70	0	0	39.2N 157.0E	50	74	-20	---	---	---	---	---	---	---	---	---
140000Z	35.6N 155.4E	70	35.5N 155.4E	65	6	-5	39.4N 159.1E	45	188	-20	---	---	---	---	---	---	---	---	---
140600Z	36.4N 156.0E	75	36.4N 156.2E	70	10	-5	40.7N 160.7E	50	290	-10	---	---	---	---	---	---	---	---	---
141200Z	37.3N 156.3E	75	37.2N 156.4E	80	8	5	41.4N 158.6E	55	211	0	---	---	---	---	---	---	---	---	---
141800Z	38.3N 155.4E	70	38.3N 156.9E	75	47	5	43.2N 159.0E	50	260	0	---	---	---	---	---	---	---	---	---
150000Z	39.3N 155.1E	65	39.3N 155.2E	65	5	0	43.7N 154.0E	40	137	0	---	---	---	---	---	---	---	---	---
150600Z	39.7N 154.4E	60	40.3N 154.6E	60	37	0	---	---	---	---	---	---	---	---	---	---	---	---	---
151200Z	40.2N 154.2E	55	38.5N 153.5E	55	53	0	---	---	---	---	---	---	---	---	---	---	---	---	---
151800Z	40.7N 154.2E	50	39.7N 154.1E	50	60	0	---	---	---	---	---	---	---	---	---	---	---	---	---
160000Z	41.4N 154.5E	40	41.4N 154.4E	40	4	0	---	---	---	---	---	---	---	---	---	---	---	---	---

TYPHOONS WHILE WIND OVER 35KTS				ALL FORECASTS					
	WARNING	24-HR	48-HR	72-HR		WARNING	24-HR	48-HR	72-HR
AVERAGE FORECAST LMKH	18NM	16NM	64NM	0NM		18NM	16NM	64NM	0NM
AVERAGE MIGHT ANGLE LMKH	12NM	14NM	61NM	0NM		12NM	14NM	61NM	0NM
AVERAGE MAGNITUDE OF WIND LMKH	4KTS	10KTS	25KTS	UKTS		4KTS	10KTS	25KTS	0KTS
AVERAGE BIAS OF WIND LMKH	-3KTS	-10KTS	-25KTS	UKTS		-3KTS	-10KTS	-25KTS	0KTS
NUMBER OF FORECASTS	15	11	1	0		15	11	1	0

# TYPHOON AGNES

1800Z 24 SEP TO 0000Z 02 OCT

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST				
POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND		
250000Z	23.3N	154.3E	35	23.5N	153.7E	35	35	0	25.4N	151.6E	50	84	0	29.3N	149.0E	65	283	5	34.1N	150.1E
250600Z	23.5N	154.0E	35	23.9N	153.2E	40	53	5	26.0N	151.1E	50	108	-5	29.8N	148.6E	65	294	0	34.4N	150.0E
251200Z	23.8N	153.0E	40	23.9N	153.8E	40	12	0	26.4N	152.3E	50	115	-10	30.7N	151.5E	60	305	-5	35.3N	154.4E
251800Z	24.1N	153.2E	45	24.1N	153.1E	45	5	0	26.7N	151.1E	60	98	0	30.3N	149.5E	65	244	-5	34.9N	152.2E
260000Z	24.4N	152.4E	50	24.2N	152.8E	50	25	0	25.4N	151.2E	60	43	0	27.5N	150.3E	65	48	-5	31.0N	149.8E
260600Z	24.5N	152.2E	55	24.4N	152.1E	50	19	-5	26.4N	150.7E	60	72	-5	28.2N	150.0E	65	62	-10	31.4N	149.8E
261200Z	24.5N	152.0E	60	24.4N	151.9E	50	25	-10	26.7N	150.5E	60	37	-5	28.4N	149.2E	65	63	-10	31.7N	149.4E
261800Z	24.7N	151.5E	60	24.7N	151.7E	60	11	0	25.4N	149.8E	70	36	0	27.3N	147.7E	75	177	0	30.3N	147.2E
270000Z	24.9N	151.0E	60	24.8N	150.7E	60	17	0	24.4N	147.8E	75	176	5	25.7N	144.2E	80	445	5	28.3N	142.2E
270600Z	25.2N	150.0E	65	25.0N	150.4E	65	16	0	25.4N	147.1E	75	202	0	27.2N	144.6E	80	446	5	29.6N	143.8E
271200Z	25.7N	150.3E	65	25.3N	150.3E	65	24	0	27.0N	148.0E	75	108	0	29.1N	147.3E	80	331	0	32.0N	144.0E
271800Z	26.2N	150.3E	70	26.2N	150.2E	70	5	0	28.4N	150.0E	80	40	5	31.6N	151.7E	80	169	-5	34.0N	156.5E
280000Z	26.7N	150.3E	70	26.5N	150.6E	75	20	5	29.1N	151.4E	75	39	0	31.9N	153.8E	60	132	-35	---	---
280600Z	27.2N	150.3E	75	27.2N	150.2E	70	5	-5	30.1N	150.9E	65	91	-10	33.3N	153.7E	50	230	-55	---	---
281200Z	28.0N	150.3E	75	28.0N	150.3E	70	0	-5	31.3N	152.1E	55	114	-25	34.4N	156.2E	40	115	-65	---	---
281800Z	28.8N	150.6E	75	28.7N	150.4E	70	12	-5	32.3N	152.2E	55	176	-30	35.2N	157.3E	40	247	-60	---	---
290000Z	29.4N	151.5E	75	29.4N	151.5E	65	0	-10	32.4N	155.1E	50	121	-45	---	---	---	---	---	---	
290600Z	29.7N	152.0E	75	30.7N	152.5E	60	30	-15	33.0N	157.0E	45	100	-40	---	---	---	---	---	---	
291200Z	29.9N	153.0E	80	30.5N	153.7E	60	36	-20	32.4N	159.7E	50	36	-55	---	---	---	---	---	---	
291800Z	30.1N	154.0E	85	30.0N	154.5E	75	6	-10	30.3N	159.4E	70	222	-30	---	---	---	---	---	---	
300000Z	30.6N	155.4E	75	30.8N	155.8E	70	13	-25	---	---	---	---	---	---	---	---	---	---	---	
300600Z	31.3N	157.0E	105	30.9N	157.1E	105	35	0	---	---	---	---	---	---	---	---	---	---	---	
301200Z	32.3N	159.7E	105	32.3N	159.5E	100	10	-5	---	---	---	---	---	---	---	---	---	---	---	
301800Z	33.4N	161.0E	100	33.6N	162.7E	100	46	0	---	---	---	---	---	---	---	---	---	---	---	

TYPHOONS WHILE WIND OVER 35KTS				ALL FORECASTS					
	WARNING	24-HR	48-HR	72-HR		WARNING	24-HR	48-HR	72-HR
AVERAGE FORECAST ERROR	19NM	10NM	231NM	410NM		19NM	10NM	231NM	410NM
AVERAGE MIGHTY ANGLE ERROR	12NM	73NM	140NM	249NM		12NM	73NM	140NM	249NM
AVERAGE MAGNITUDE OF WIND ERROR	5KTS	15KTS	17KTS	18KTS		5KTS	15KTS	17KTS	18KTS
AVERAGE BIAS OF WIND ERROR	-4KTS	-14KTS	-15KTS	-18KTS		-4KTS	-14KTS	-15KTS	-18KTS
NUMBER OF FORECASTS	24	20	16	12		24	20	16	12

TYPHOON BESS  
0600Z 04 OCT TO 0600Z 14 OCT

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST				
	POSIT	WIND		POSIT	WIND		POSIT	WIND		POSIT	WIND		POSIT	WIND		POSIT	WIND		POSIT	WIND
090000Z	16.1N 129.5E	40	16.3N 129.5E	40	12	0	18.0N 123.3E	55	137	-10	18.4N 118.3F	55	149	0	18.5N 113.7E	70	223	5		
091200Z	16.1N 128.3E	45	16.4N 127.6E	50	44	5	17.4N 121.0E	50	161	-15	18.3N 116.6F	65	143	10	19.0N 111.7E	65	206	20		
091800Z	16.1N 127.3E	55	16.2N 127.4E	55	8	0	16.4N 122.0E	70	50	5	17.4N 117.7E	70	108	5	18.0N 112.0E	90	151	30		
100000Z	16.6N 126.4F	60	16.6N 126.3E	60	0	0	17.4N 121.5E	60	36	-5	18.5N 117.2F	70	12	5	19.9N 112.9E	90	76	35		
100600Z	16.9N 125.4E	65	16.7N 125.0E	60	26	-5	17.4N 120.0E	55	34	0	18.5N 116.0E	70	67	5	19.7N 113.0E	90	49	40		
101200Z	17.1N 124.4E	65	17.1N 124.6E	65	11	0	18.0N 121.5E	65	87	10	19.2N 118.9E	70	141	5	20.6N 116.3E	90	322	45		
101800Z	17.4N 123.2E	65	17.1N 123.1E	70	19	5	19.0N 119.8E	60	45	-5	20.3N 117.3E	75	138	15	22.1N 115.1E	90	388	65		
110000Z	17.7N 122.1E	65	17.1N 122.0E	75	6	10	19.2N 118.7E	75	25	10	20.8N 116.4E	95	178	40	22.9N 114.4E	65	476	40		
110600Z	18.0N 120.9F	55	18.2N 120.6E	65	21	10	19.4N 116.4E	90	72	25	21.3N 112.5E	95	132	45	---	---	---	---		
111200Z	18.3N 120.0E	55	18.5N 119.6E	65	26	10	19.7N 115.7E	85	49	20	21.1N 111.7E	90	130	45	---	---	---	---		
111800Z	18.5N 119.2E	65	18.6N 119.2E	65	6	0	19.4N 115.2E	90	24	30	21.1N 111.5E	90	184	65	---	---	---	---		
120000Z	18.9N 118.4E	65	18.6N 118.2E	65	13	0	20.4N 114.4E	90	85	35	22.4N 110.9F	40	294	15	---	---	---	---		
120600Z	19.1N 117.6E	65	19.2N 117.3E	70	18	5	20.7N 114.0E	90	131	40	---	---	---	---	---	---	---	---		
121200Z	19.2N 116.4E	65	19.3N 116.9E	70	29	5	20.5N 114.3E	70	214	25	---	---	---	---	---	---	---	---		
121800Z	19.1N 115.2E	60	19.3N 114.0E	65	69	5	19.4N 107.7E	50	87	25	---	---	---	---	---	---	---	---		
130000Z	19.1N 114.0E	55	19.3N 112.3E	55	85	0	19.7N 106.0E	40	62	15	---	---	---	---	---	---	---	---		
130600Z	19.1N 112.4E	45	19.4N 112.4E	45	6	-5	---	---	---	---	---	---	---	---	---	---	---	---		
131200Z	19.1N 110.0E	45	19.0N 110.4E	40	23	-5	---	---	---	---	---	---	---	---	---	---	---	---		
131800Z	19.0N 109.0E	25	19.0N 108.1E	35	51	10	---	---	---	---	---	---	---	---	---	---	---	---		
140000Z	19.1N 106.9E	25	19.1N 107.1E	30	11	5	---	---	---	---	---	---	---	---	---	---	---	---		

TYPHOONS WHILE WIND OVER 75KTS				ALL FORECASTS			
WARNING	24-HR	48-HR	72-HR	WARNING	24-HR	48-HR	72-HR
23NM	82NM	131NM	180NM	24NM	81NM	149NM	243NM
9NM	40NM	71NM	46NM	9NM	42NM	85NM	45NM
4KTS	17KTS	18KTS	29KTS	4KTS	17KTS	21KTS	35KTS
2KTS	12KTS	18KTS	29KTS	3KTS	13KTS	21KTS	35KTS
NUMBER OF FORECASTS	18	14	10	20	16	12	4

TYPHOON CARMEN  
1200Z 14 OCT TO 1200Z 19 OCT

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
	POSIT	WIND		POSIT	WIND		POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	
141200Z	12.0N 130.1E	30	12.2N 129.7E	30	26	0	13.0N 126.6E	45	76	-10	---	---	---	---	---	---	---	---	
141800Z	11.9N 129.2E	40	12.3N 128.6E	30	42	-10	12.4N 126.8E	45	160	-15	---	---	---	---	---	---	---	---	
150000Z	12.1N 128.0E	45	11.8N 128.1E	45	19	0	12.4N 124.7E	50	179	-15	13.4N 121.6E	45	123	-10	14.5N 118.5E	55	368	-15	
150600Z	12.8N 126.8E	50	12.3N 127.6E	45	55	-5	13.3N 124.4E	60	184	-10	14.2N 121.3E	50	336	-10	15.2N 118.1E	55	347	-15	
151200Z	13.7N 125.0E	55	13.4N 125.4E	50	19	-5	15.3N 121.2E	60	80	0	16.3N 117.2E	60	154	-5	16.8N 113.8E	80	227	5	
151800Z	14.4N 124.0E	60	14.6N 124.5E	50	13	-10	16.5N 120.3E	50	48	0	17.7N 116.3E	65	110	0	18.3N 113.1E	80	158	10	
160000Z	15.2N 123.0E	65	15.4N 123.8E	65	17	0	18.0N 120.0E	55	85	0	19.2N 115.6E	75	43	5	19.3N 111.0E	80	178	15	
160600Z	15.9N 122.7E	70	15.6N 122.8E	70	19	0	16.4N 118.7E	65	116	5	17.7N 114.3E	85	154	15	17.7N 109.2E	75	495	20	
161200Z	16.6N 121.5E	60	16.4N 121.7E	65	17	5	18.3N 117.8E	65	77	0	19.1N 114.1E	85	87	10	19.3N 110.3E	75	172	30	
161800Z	17.2N 119.9E	50	17.2N 119.9E	55	0	5	18.4N 115.8E	75	36	10	19.8N 112.1E	85	134	15	---	---	---	---	
170000Z	17.9N 118.5E	55	18.2N 118.2E	65	25	10	20.5N 112.4E	85	172	15	---	---	---	---	---	---	---	---	
170600Z	18.4N 117.4E	60	18.6N 117.3E	65	13	5	20.4N 112.7E	85	131	15	22.1N 108.9E	25	222	-30	---	---	---	---	
171200Z	18.9N 116.0E	65	18.8N 116.5E	65	8	0	20.4N 112.8E	80	112	5	21.6N 109.2E	50	156	5	---	---	---	---	
171800Z	19.5N 115.9E	65	19.4N 115.8E	65	8	0	21.4N 112.6E	80	104	10	---	---	---	---	---	---	---	---	
180000Z	19.9N 115.4E	70	19.8N 115.3E	70	8	0	22.1N 112.7E	70	83	5	---	---	---	---	---	---	---	---	
180600Z	20.2N 115.0E	70	20.1N 115.1E	75	8	5	21.7N 113.5E	80	46	25	---	---	---	---	---	---	---	---	
181200Z	20.4N 114.8E	75	20.4N 114.7E	75	6	0	22.0N 113.2E	75	69	30	---	---	---	---	---	---	---	---	
181800Z	20.7N 114.3E	70	20.8N 114.3E	80	6	10	---	---	---	---	---	---	---	---	---	---	---	---	
190000Z	21.0N 113.6E	65	21.3N 113.7E	75	19	10	---	---	---	---	---	---	---	---	---	---	---	---	
190600Z	21.3N 112.8E	55	21.6N 113.1E	65	24	10	---	---	---	---	---	---	---	---	---	---	---	---	
191200Z	21.7N 112.0E	45	22.2N 112.3E	45	34	0	---	---	---	---	---	---	---	---	---	---	---	---	

TYPHOONS WHILE WIND OVER 75KTS				ALL FORECASTS			
WARNING	24-HR	48-HR	72-HR	WARNING	24-HR	48-HR	72-HR
18NM	103NM	172NM	249NM	18NM	103NM	172NM	249NM
11NM	40NM	115NM	166NM	12NM	40NM	115NM	166NM
5KTS	1UKTS	11KTS	16KTS	4KTS	10KTS	11KTS	16KTS
2KTS	4KTS	11KTS	7KTS	1KTS	4KTS	11KTS	7KTS
NUMBER OF FORECASTS	20	17	10	21	17	10	7

14PHOON ULLA  
0000Z 21 OCT TO 0000Z 27 OCT

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND	POSIT	WIND		
210000Z	12.8N 129.7E	35	12.9N 129.3E	30	8	-5	14.7N 124.4E	45	106	-10	---	---	---	---	---	---	---		
210600Z	13.6N 128.0E	40	13.4N 127.7E	40	21	0	16.0N 123.0E	65	129	5	19.1N 120.4E	50	63	-20	22.5N 119.0E	65	275	-10	
211200Z	14.5N 126.8E	45	14.4N 126.2E	50	24	5	18.0N 124.7E	65	34	5	20.3N 124.1E	60	196	-10	24.6N 123.2E	50	567	-25	
211800Z	15.4N 125.8E	50	15.5N 125.9E	55	8	5	19.3N 124.1E	70	43	5	24.4N 124.7E	75	29	5	29.0N 124.1E	65	933	-15	
220000Z	16.3N 125.2E	55	16.4N 125.1E	55	8	0	20.7N 124.2E	75	132	5	24.7N 128.5E	70	628	-5	28.5N 136.0E	55	1271	-30	
220600Z	17.3N 124.4E	60	17.1N 124.8E	60	12	0	20.8N 124.8E	75	206	5	25.0N 129.0E	65	654	-10	28.4N 136.9E	50	1374	-40	
221200Z	18.3N 124.2E	60	18.3N 124.5E	65	17	5	22.4N 126.5E	75	373	5	26.2N 133.1E	55	966	-20	---	---	---	---	
221800Z	19.0N 123.4E	65	19.3N 123.8E	65	29	0	23.7N 126.5E	70	404	0	27.0N 133.6E	55	1059	-25	---	---	---	---	
230000Z	19.4N 122.3E	70	19.3N 122.5E	70	13	0	20.7N 118.8E	75	135	0	22.2N 116.6E	60	255	-25	---	---	---	---	
230600Z	19.3N 121.5E	70	19.2N 121.5E	75	6	5	20.7N 118.4E	80	143	5	22.5N 116.7E	70	293	-20	---	---	---	---	
231200Z	19.0N 120.9E	70	19.3N 121.0E	75	19	5	20.0N 118.6E	80	129	5	22.5N 116.6E	65	115	-25	---	---	---	---	
231800Z	18.5N 120.3E	70	18.7N 120.2E	75	13	5	18.5N 117.8E	80	53	0	19.3N 114.7E	80	153	-5	21.3N 112.3E	65	304	25	
240000Z	18.1N 119.7E	75	18.2N 119.6E	80	8	5	17.5N 116.5E	70	50	-15	17.3N 113.2E	60	165	-20	17.2N 109.9E	50	273	15	
240600Z	17.9N 119.1E	75	17.9N 119.0E	75	6	0	17.4N 116.2E	65	108	-25	17.7N 112.8E	55	105	-5	---	---	---	---	
241200Z	17.9N 118.1E	75	18.1N 118.3E	75	16	0	18.1N 115.3E	65	120	-25	18.2N 112.0E	55	118	5	---	---	---	---	
241800Z	17.9N 117.1E	80	18.0N 116.9E	75	13	-5	18.0N 113.2E	65	72	-20	17.9N 109.8E	55	183	15	---	---	---	---	
250000Z	18.0N 115.8E	85	18.0N 115.9E	75	6	-10	17.9N 111.7E	65	80	-15	17.6N 107.5E	50	153	15	---	---	---	---	
250600Z	18.1N 114.4E	90	18.1N 114.2E	85	11	-5	18.2N 109.3E	70	68	10	---	---	---	---	---	---	---		
251200Z	18.3N 113.2E	90	18.4N 113.2E	85	6	-5	20.1N 108.5E	55	36	5	---	---	---	---	---	---	---		
251800Z	18.6N 112.1E	85	18.7N 112.1E	85	6	0	20.3N 108.1E	55	70	15	---	---	---	---	---	---	---		
260000Z	19.0N 110.9E	80	19.0N 111.3E	80	23	0	20.7N 107.5E	55	116	20	---	---	---	---	---	---	---		
260600Z	19.3N 109.6E	85	19.4N 109.3E	85	18	5	---	---	---	---	---	---	---	---	---	---	---		
261200Z	19.5N 108.4E	50	19.6N 108.3E	55	8	5	---	---	---	---	---	---	---	---	---	---	---		
261800Z	19.6N 107.1E	40	19.6N 107.2E	45	13	5	---	---	---	---	---	---	---	---	---	---	---		
270000Z	19.6N 105.8E	35	19.7N 105.7E	40	8	5	---	---	---	---	---	---	---	---	---	---	---		

TYPHOONS WHILE WIND OVER 35KTS				ALL FORECASTS			
WARNING	24-HR	48-HR	72-HR	WARNING	24-HR	48-HR	72-HR
13NM	12NM	31NM	71NM	13NM	12NM	31NM	71NM
9NM	8NM	25NM	47NM	9NM	8NM	25NM	47NM
3KTS	10KTS	14KTS	33KTS	3KTS	10KTS	14KTS	33KTS
1KTS	-1KTS	-1KTS	-1KTS	1KTS	-1KTS	-1KTS	-1KTS
NUMBER OF FORECASTS	25	21	10	25	21	10	7

14PHOON ELAINE  
0600Z 24 OCT TO 0600Z 31 OCT

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT		WIND		POSIT		WIND		POSIT		WIND	ERRORS	POSIT		WIND	ERRORS	POSIT		WIND	ERRORS
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
240600Z	17.7N	140.4E	30	17.8N	140.3E	30	8	0	19.8N	136.7E	45	127	10	---	---	---	---	---	---
241200Z	18.1N	139.5E	30	18.3N	139.5E	30	12	0	20.5N	136.0E	45	182	5	---	---	---	---	---	---
241800Z	18.1N	138.5E	30	18.5N	138.5E	30	24	0	20.8N	135.0E	45	212	-5	---	---	---	---	---	---
250000Z	17.9N	137.4E	30	18.3N	137.4E	35	24	5	18.8N	133.4E	60	104	0	19.9N	129.9E	80	228	-5	21.5N
250600Z	17.7N	136.4E	35	17.9N	136.7E	40	21	5	18.2N	132.9E	60	112	-5	19.4N	129.8E	80	259	-10	21.3N
251200Z	17.5N	135.4E	40	17.5N	135.6E	45	11	5	17.3N	131.4E	65	83	-10	18.4N	128.0E	85	223	-10	20.5N
251800Z	17.3N	134.4E	50	17.3N	134.3E	50	6	0	17.2N	130.0E	70	76	-10	18.5N	126.5E	90	209	-5	20.3N
260000Z	17.1N	133.0E	60	17.0N	133.4E	60	24	0	16.7N	128.9E	80	87	-5	18.0N	125.0E	95	190	15	19.5N
260600Z	16.8N	131.6E	65	16.8N	131.6E	65	0	0	16.5N	126.7E	85	50	-5	17.3N	122.6E	95	128	25	18.7N
261200Z	16.9N	130.0E	70	16.6N	130.2E	70	21	-5	16.3N	125.4E	95	74	0	18.8N	121.3E	85	142	10	18.0N
261800Z	16.9N	128.7E	60	16.8N	128.4E	60	18	0	17.1N	122.4E	105	39	10	18.3N	116.7E	105	85	30	19.9N
270000Z	16.9N	127.4E	65	16.9N	127.1E	65	17	0	17.2N	121.6E	80	19	0	18.1N	116.6E	80	46	10	19.4N
270600Z	17.0N	126.0E	90	16.8N	126.2E	90	17	0	16.9N	121.0E	80	79	10	17.0N	116.0E	90	124	20	18.2N
271200Z	17.2N	124.5E	95	17.0N	124.5E	100	12	5	17.3N	119.3E	75	38	0	17.7N	115.1E	90	133	25	19.6N
271800Z	17.4N	123.0E	95	17.3N	122.9E	100	8	5	17.9N	117.8E	85	29	10	18.9N	113.7E	95	104	40	21.2N
280000Z	17.5N	121.7E	80	17.5N	121.7E	90	0	10	18.6N	116.4E	85	51	15	19.9N	111.9E	95	137	45	21.9N
280600Z	17.7N	120.4E	70	17.7N	120.3E	70	6	0	18.6N	115.4E	95	65	25	20.3N	111.1E	85	157	45	22.7N
281200Z	17.9N	119.1E	75	17.5N	119.3E	75	11	0	19.1N	114.7E	100	66	35	21.0N	111.1E	80	134	45	---
281800Z	18.2N	118.2E	75	18.1N	118.0E	75	13	0	19.6N	113.7E	95	74	40	21.8N	110.7E	55	154	25	---
290000Z	18.5N	117.4E	70	18.3N	117.0E	85	21	15	19.9N	113.2E	95	78	45	22.6N	110.1E	40	197	10	---
290600Z	19.1N	116.5E	70	19.0N	116.5E	80	6	10	21.1N	110.1E	65	18	25	23.3N	112.3E	30	191	5	---
291200Z	19.9N	115.5E	65	19.6N	115.6E	70	19	5	22.0N	113.0E	60	66	25	---	---	---	---	---	---
291800Z	20.5N	114.6E	55	21.6N	114.9E	60	34	5	24.8N	114.6E	25	244	-5	---	---	---	---	---	---
300000Z	20.9N	114.1E	50	21.0N	114.0E	60	8	10	24.7N	111.9E	20	218	-10	---	---	---	---	---	---
300600Z	21.0N	113.8E	40	21.2N	113.6E	50	16	10	22.7N	111.8E	20	160	-5	---	---	---	---	---	---
301200Z	21.0N	113.5E	35	21.3N	113.5E	35	18	0	---	---	---	---	---	---	---	---	---	---	---
301800Z	20.9N	113.3E	30	21.1N	113.5E	35	16	5	---	---	---	---	---	---	---	---	---	---	---
310000Z	20.7N	113.0E	30	20.7N	113.0E	30	0	0	---	---	---	---	---	---	---	---	---	---	---
310600Z	20.1N	112.5E	25	20.4N	112.6E	25	19	0	---	---	---	---	---	---	---	---	---	---	---

TYPHOONS WHILE WIND OVER 35KTS				ALL FORECASTS			
WARNING	24-HR	48-HR	72-HR	WARNING	24-HR	48-HR	72-HR
14NM	79NM	134NM	248NM	14NM	94NM	158NM	250NM
9NM	59NM	83NM	127NM	9NM	75NM	97NM	152NM
4KTS	13KTS	23KTS	37KTS	4KTS	13KTS	23KTS	35KTS
1KTS	10KTS	19KTS	37KTS	1KTS	8KTS	18KTS	35KTS
NUMBER OF FORECASTS	22	22	15	24	25	18	14

TYPHOON GLORIA  
0000Z 07 NOV TO 1200Z 09 NOV

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND		POSIT		WIND	
030000Z		7.3N 141.3E		7.3N 141.2E		30		8.4N 138.4E		45		8.4N 130.7E		85		10.8N 125.4E		95	
030000Z		7.5N 140.6E		7.7N 140.5E		45		8.4N 135.9E		65		10.7N 131.7E		85		12.4N 127.3E		100	
031000Z		7.9N 139.7E		7.9N 139.7E		50		9.2N 135.9E		65		10.2N 130.6E		85		11.9N 126.1E		100	
031000Z		9.0N 138.7E		8.2N 138.8E		50		9.1N 134.9E		65		10.2N 130.6E		85		11.9N 126.1E		100	
040000Z		10.3N 137.9E		10.1N 137.9E		55		12.3N 133.5E		70		13.8N 129.3E		85		15.1N 125.4E		100	
040000Z		11.8N 136.8E		11.1N 136.7E		60		13.7N 131.9E		80		15.5N 127.7E		95		17.0N 123.9E		110	
041000Z		13.5N 135.4E		13.3N 135.6E		75		17.4N 131.5E		110		19.8N 127.4E		115		21.1N 123.6E		90	
041000Z		14.7N 133.6E		14.7N 133.5E		80		17.4N 126.6E		115		18.9N 120.2E		95		20.6N 115.8E		75	
050000Z		15.6N 131.4E		15.6N 131.2E		85		17.5N 124.6E		115		18.8N 119.3E		95		19.6N 114.9E		80	
050000Z		16.0N 130.0E		16.1N 130.0E		105		18.2N 124.6E		125		19.2N 120.1E		100		19.5N 115.9E		85	
051000Z		15.9N 128.5E		16.2N 128.4E		100		17.3N 121.4E		85		18.5N 116.1E		70		19.8N 111.3E		55	
051000Z		15.7N 127.4E		16.0N 127.2E		90		16.0N 121.4E		80		16.0N 116.0E		65		16.8N 110.7E		50	
060000Z		15.9N 126.7E		15.6N 126.3E		85		15.4N 122.0E		80		15.4N 117.9E		55		15.8N 114.2E		70	
060000Z		16.5N 125.9E		16.4N 125.7E		110		18.1N 122.0E		100		19.1N 118.4E		85		20.1N 115.2E		65	
061000Z		17.0N 124.6E		17.2N 124.8E		110		19.3N 120.8E		100		20.4N 116.7E		90		21.4N 113.0E		70	
061000Z		17.5N 123.2E		17.5N 123.1E		115		18.4N 118.0E		75		19.3N 113.9E		85		20.3N 110.7E		70	
070000Z		17.9N 121.5E		18.1N 121.5E		100		19.3N 116.2E		85		20.6N 112.3E		75		21.2N 111.8E		65	
070000Z		18.1N 119.8E		18.4N 120.0E		85		19.6N 115.2E		90		21.2N 111.8E		65		21.2N 111.8E		65	
071000Z		18.4N 118.9E		18.5N 119.0E		85		19.8N 114.8E		80		21.4N 111.7E		60		21.4N 111.7E		60	
071000Z		19.1N 118.3E		18.7N 117.9E		90		20.1N 113.8E		75		20.1N 113.8E		75		20.1N 113.8E		75	
080000Z		19.9N 117.8E		19.7N 117.8E		70		22.4N 117.1E		40		22.4N 117.1E		40		22.4N 117.1E		40	
080000Z		20.7N 117.4E		20.5N 117.5E		60		23.4N 117.5E		40		23.4N 117.5E		40		23.4N 117.5E		40	
081000Z		21.5N 117.2E		22.0N 117.2E		50		26.0N 117.4E		20		26.0N 117.4E		20		26.0N 117.4E		20	
081000Z		21.9N 117.0E		22.7N 116.7E		45		26.0N 117.4E		20		26.0N 117.4E		20		26.0N 117.4E		20	
090000Z		22.2N 116.8E		22.4N 116.7E		35		26.0N 117.4E		20		26.0N 117.4E		20		26.0N 117.4E		20	
090000Z		22.3N 116.4E		22.3N 116.4E		40		26.0N 117.4E		20		26.0N 117.4E		20		26.0N 117.4E		20	
091000Z		22.2N 116.1E		22.2N 116.0E		30		26.0N 117.4E		20		26.0N 117.4E		20		26.0N 117.4E		20	

TYPHOONS WHILE WIND OVER 35KTS										ALL FORECASTS									
WARNING		24-HR		48-HR		72-HR		WARNING		24-HR		48-HR		72-HR		WARNING		24-HR	
AVERAGE FORECAST ERROR		18NM		150NM		294NM		17NM		160NM		220NM		275NM		17NM		160NM	
AVERAGE WIND ANGLE ERROR		13NM		97NM		150NM		12NM		103NM		106NM		197NM		12NM		103NM	
AVERAGE MAGNITUDE OF WIND ERROR		6KTS		21KTS		15KTS		6KTS		20KTS		17KTS		19KTS		6KTS		20KTS	
AVERAGE DIAL OF WIND ERROR		2KTS		8KTS		10KTS		2KTS		8KTS		10KTS		14KTS		2KTS		8KTS	
NUMBER OF FORECASTS		25		21		16		27		23		18		14		27		23	

TYPHOON INMA  
1200Z 21 NOV TO 0600Z 02 DEC

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST							
	POSIT	WIND		POSIT	WIND		ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS	POSIT	WIND	ERRORS				
211200Z	9.7N	141.0E	25	9.7N	141.0E	25	0	0	11.0N	137.8E	40	142	5	---	---	---	---	---	---				
211600Z	10.3N	141.0E	25	9.6N	141.2E	25	43	0	10.5N	138.1E	40	129	-5	---	---	---	---	---	---				
220000Z	10.8N	140.5E	30	11.2N	140.3E	25	27	-5	13.5N	137.8E	40	138	-10	---	---	---	---	---	---				
220600Z	11.1N	140.4E	30	10.8N	139.8E	25	39	-5	12.7N	137.2E	40	101	-15	---	---	---	---	---	---				
221200Z	11.3N	140.2E	35	11.4N	140.2E	25	6	-10	13.8N	138.1E	40	54	-20	---	---	---	---	---	---				
221800Z	11.6N	140.0E	45	12.1N	139.9E	30	30	-15	14.9N	138.1E	45	184	-20	---	---	---	---	---	---				
230000Z	11.9N	139.5E	50	12.4N	139.3E	40	32	-10	14.7N	137.0E	60	76	-10	17.5N	135.1E	70	182	-15	21.0N	134.3E	75	374	-30
230600Z	12.4N	138.9E	55	12.4N	139.0E	50	6	-5	14.1N	136.5E	70	70	-5	16.1N	133.9E	80	83	-10	18.8N	131.4E	85	404	-25
231200Z	12.9N	138.1E	60	13.0N	137.4E	60	41	0	15.1N	133.6E	80	58	5	18.0N	130.7E	90	175	-5	21.2N	128.9E	90	320	-25
231800Z	13.4N	137.2E	65	13.6N	137.1E	60	13	-5	15.7N	133.6E	80	60	0	18.2N	130.3E	90	169	-10	21.1N	128.2E	90	324	-25
240000Z	13.7N	136.2E	70	13.9N	136.3E	70	13	0	15.9N	132.7E	90	64	5	18.9N	130.5E	100	192	-5	22.4N	130.8E	100	471	-15
240600Z	14.1N	135.3E	75	14.1N	135.3E	70	0	-5	16.0N	131.7E	80	79	-10	19.0N	129.6E	85	197	-25	22.7N	129.4E	80	474	-30
241200Z	14.5N	134.4E	75	14.6N	134.3E	70	8	-5	16.9N	130.9E	80	116	-15	20.0N	129.2E	85	258	-30	23.6N	129.8E	80	560	-25
241800Z	14.7N	133.7E	80	15.0N	133.2E	75	34	-5	17.3N	129.8E	85	145	-15	20.7N	128.6E	85	304	-30	24.1N	129.9E	75	634	-25
250000Z	15.0N	133.3E	85	15.0N	133.2E	80	6	-5	17.5N	131.0E	85	108	-20	20.5N	130.0E	80	352	-35	25.6N	134.3E	70	938	-20
250600Z	15.2N	132.8E	90	15.2N	132.7E	85	6	-5	17.5N	130.6E	90	117	-20	21.0N	130.1E	85	417	-25	25.7N	134.7E	70	1007	0
251200Z	15.5N	132.3E	95	15.5N	132.3E	90	0	-5	17.0N	130.1E	105	112	-10	19.8N	128.7E	100	354	-5	24.1N	132.4E	80	909	20
251800Z	15.7N	131.7E	100	15.8N	131.6E	95	8	-5	17.5N	129.5E	105	153	-10	20.5N	129.0E	100	445	0	24.5N	134.8E	80	1076	25
260000Z	15.7N	130.8E	105	16.0N	130.9E	100	19	-5	17.5N	128.8E	110	174	-5	20.0N	127.8E	100	434	10	24.3N	133.3E	80	1036	20
260600Z	15.7N	129.8E	110	15.7N	129.9E	100	6	-10	16.9N	126.9E	110	116	0	19.3N	125.0E	100	351	30	21.8N	125.6E	80	635	30
261200Z	15.7N	128.7E	115	15.8N	128.9E	110	13	-5	16.8N	125.5E	110	99	5	18.6N	122.7E	90	278	30	21.8N	124.5E	80	627	20
261800Z	15.7N	127.6E	115	14.0N	127.5E	110	19	-5	17.2N	124.4E	100	121	0	19.3N	122.8E	90	347	35	21.7N	124.4E	80	667	15
270000Z	15.7N	126.4E	115	15.8N	126.5E	115	8	0	16.5N	122.0E	100	66	10	17.6N	118.0E	75	129	15	18.9N	114.9E	60	182	10
270600Z	15.7N	125.3E	110	15.8N	125.5E	115	13	5	16.2N	121.0E	90	64	20	16.9N	116.9E	75	77	15	17.9N	113.3E	60	85	-15
271200Z	15.6N	124.3E	105	15.6N	124.3E	115	0	10	15.8N	119.8E	70	45	10	16.5N	115.7E	60	45	20	17.4N	112.9E	65	25	-10
271800Z	15.6N	123.1E	100	15.6N	123.1E	100	0	0	16.3N	118.4E	70	66	15	17.1N	114.3E	75	72	10	18.5N	110.8E	65	85	-5
280000Z	15.4N	121.9E	90	15.7N	121.6E	90	25	0	16.1N	116.9E	55	58	-5	17.2N	113.0E	40	64	-30	18.8N	109.6E	30	131	-35
280600Z	15.2N	120.6E	70	15.2N	120.5E	70	6	0	14.8N	115.7E	65	67	5	15.6N	111.7E	50	83	-25	17.2N	108.4E	40	233	-20
281200Z	15.1N	119.5E	60	15.4N	119.7E	70	21	10	15.4N	116.1E	65	47	5	16.0N	113.4E	50	91	-25	18.0N	111.6E	40	137	-15
281800Z	15.2N	118.5E	55	15.1N	118.6E	60	8	5	15.4N	114.5E	50	25	-15	17.1N	112.2E	40	42	-30	19.6N	111.0E	30	110	-20
290000Z	15.5N	117.5E	60	15.5N	117.4E	60	6	0	16.4N	113.4E	55	24	-15	17.9N	109.5E	45	142	-20	19.3N	106.4E	35	349	-5
290600Z	15.7N	116.4E	60	16.1N	116.3E	60	25	0	18.1N	112.2E	50	94	-25	20.0N	109.6E	35	129	-25	22.5N	108.1E	40	308	-15
291200Z	15.8N	115.4E	60	15.8N	115.2E	60	11	0	17.7N	111.4E	50	63	-25	21.3N	109.1E	30	170	-25	---	---	---	---	---
291800Z	15.9N	114.4E	65	16.0N	114.1E	60	18	-5	18.0N	110.3E	45	103	-25	21.7N	108.8E	25	206	-25	---	---	---	---	---
300000Z	16.2N	113.4E	70	16.4N	113.4E	60	12	-10	17.9N	110.2E	55	105	-10	19.8N	107.7E	35	220	-5	---	---	---	---	---
300600Z	16.6N	112.7E	75	16.3N	112.9E	60	21	-15	17.3N	110.2E	55	135	-5	18.4N	107.9E	45	407	10	---	---	---	---	---
301200Z	17.1N	112.3E	80	17.1N	112.3E	60	0	-15	19.4N	110.5E	50	92	-5	---	---	---	---	---	---	---	---	---	---
301800Z	17.8N	112.1E	70	17.8N	111.8E	60	17	-10	20.4N	110.7E	45	100	-5	---	---	---	---	---	---	---	---	---	---
010000Z	18.6N	111.9E	65	18.6N	111.8E	70	6	5	21.4N	112.3E	55	46	15	---	---	---	---	---	---	---	---	---	---
010600Z	19.4N	111.8E	60	19.4N	111.8E	60	0	0	22.3N	112.9E	35	46	0	---	---	---	---	---	---	---	---	---	---
011200Z	20.2N	111.9E	55	20.2N	112.0E	55	6	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
011800Z	20.9N	112.4E	50	20.9N	112.3E	55	6	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
020000Z	21.6N	113.1E	40	21.6N	112.7E	40	22	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
020600Z	22.5N	113.7E	35	22.4N	113.0E	35	39	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TYPHOONS WHILE WIND OVER 35KTS										ALL FORECASTS									
WARNING					24-HR					WARNING					24-HR				
AVERAGE FORECAST ERROR					13NM					15NM					15NM				
AVERAGE MIGHT ANGLE ERROR					9NM					9NM					9NM				
AVERAGE MAGNITUDE OF WIND ERROR					5KTS					5KTS					5KTS				
AVERAGE BIAS OF WIND ERROR					-3KTS					-3KTS					-3KTS				
NUMBER OF FORECASTS					40					44					44				



# ANNEX A

## SUMMARY OF TROPICAL CYCLONES IN THE CENTRAL NORTH PACIFIC

### 1. GENERAL RESUME

Fleet Weather Central, Pearl Harbor, issued warnings on three tropical cyclones in 1974 for the Central Pacific as shown in Table A-1. Warnings were coordinated with the Central Pacific Hurricane Center, Honolulu, and the Eastern Pacific Hurricane Center, San Francisco, in accordance with the National Hurricane Operations Plan.

TABLE A-1. COMPARISON OF CENTRAL PACIFIC ANNUAL WARNING AND CLIMATOLOGY DATA

	1970	1971	1972	1973	1974
TOTAL NUMBER OF WARNINGS	27	19	76	43	32
CALENDAR DAYS OF WARNINGS	8	8	21	13	9
TROPICAL DEPRESSIONS	1	1	0	1	1
TROPICAL STORMS	1	1	3	0	1
HURRICANES	1	1	1	1	1
TOTAL	3	3	4	2	3

### 2. CENTRAL PACIFIC'S HURRICANE SEASON<sup>1</sup>

The 1974 Hurricane Season in the Central Pacific followed a pattern similar to that of recent years-short but active. Between the 9th and 30th of August, 3 tropical cyclones posed a possible threat to the Hawaiian Islands.

The first of these, Tropical Depression #11, after formation near 12N 133W, drifted westward as a weak tropical depression, never reaching storm strength during its life, passed 140W on the 8th and died a few days later.

Tropical Storm Olive formed in the Intertropical Convergence Zone on the 21st near 10N 147W, 10 days after the end of Tropical Depression #11, and barely attained storm strength as she moved west-northwestward ending her short life 240 miles southeast of Johnston Island.

Hurricane Ione developed off Central America and travelled westward crossing 140W on the 23rd as a hurricane at 13N reaching maximum winds of 95 kts shortly after turning sharply northward on the 25th. She slowly curved northeastward and appeared to be heading for a quick ending over the colder Eastern Pacific waters but instead slowly turned northwestward as the high pressure ridge north of her strengthened. Ione weakened to tropical storm intensity and reached her highest latitude of 19.5N on the 27th before swinging southwestward and further weakening to a tropical depression before ending her career on the 30th, 170 miles southsoutheast of South Point, Hawaii.

<sup>1</sup> Extracted from report submitted by Meteorologist-in-Charge, NWS Forecast Office Honolulu, Hawaii.

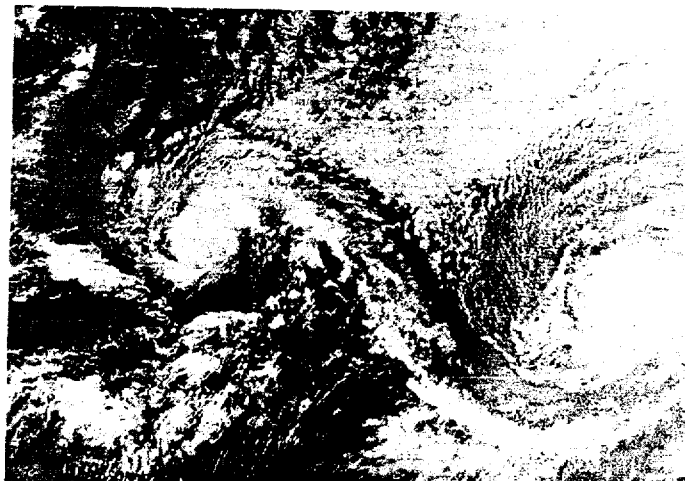
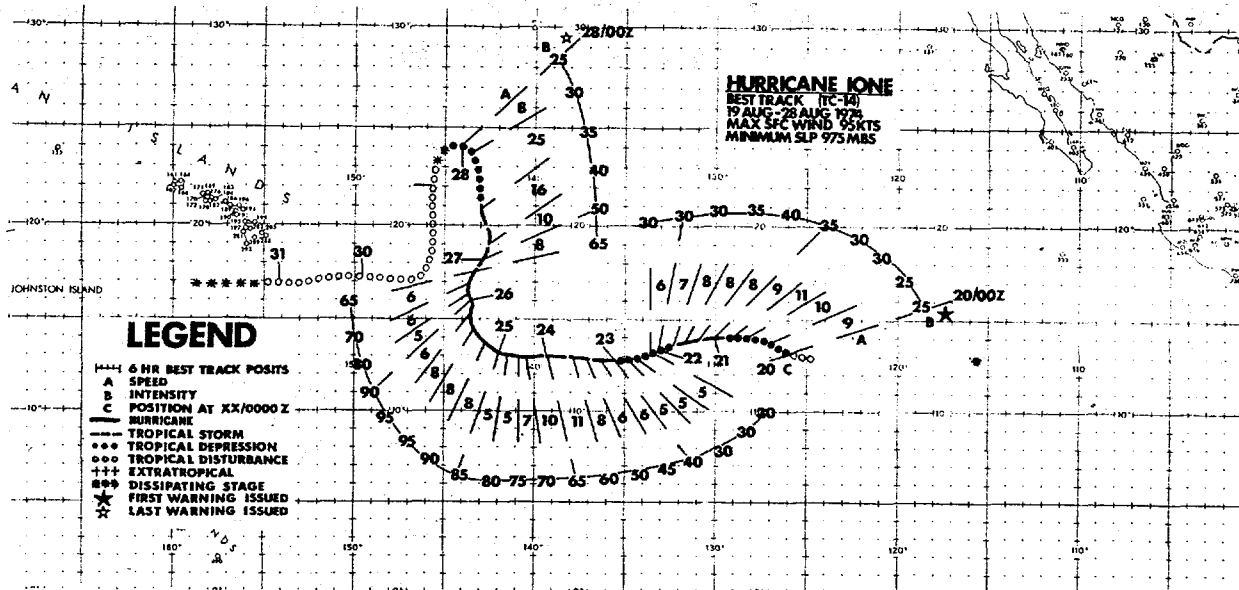


FIGURE A-1. Hurricane Ione (right) and Tropical Storm Olive, 24 August 1974, 1827Z.

### 3. HURRICANE TRACKS



### 4. CENTER FIX DATA-HURRICANES

HURRICANE IONE  
FIX POSITIONS FOR CYCLONE NO. 14  
0000Z 20 AUG TO 0600Z 26 AUG

FIX NO.	TIME	POSIT	FIX ACCRY	FIX LVL	FLI LVL	WIND DIR	WIND VEL	WIND BRG	WIND RNG	MAX OBS SFC WIND	MAX OBS VEL	MAX OBS BRG	MAX OBS RNG	OBS MIN SLP	MIN T/O	FLT T/O	EYE FORM	ORLEN- TATION	EYE DIA	POSIT OF RADAR	MSN NMBR
1	210544Z	14.0N 130.0W	SAT	(IR DATA					1	NON	0MSP										
2	211717Z	13.5N 132.2W	SAT							PCN 1	UMSP										
3	211803Z	13.5N 132.5W	SAT	(12.5/2.5+S					/25HRS	NON	UMSP										
4	221659Z	12.7N 134.5W	SAT							PCN 1	UMSP										
5	232031Z	12.9N 138.9W	SAT	(14.0/4.0					/02.0/27HRS	PCN 1	UMSP										
6	241804Z	13.0N 141.5W	SAT	(15.0/5.0					/S/0.18HRS	PCN 1	UMSP										
7	251630Z	14.5N 143.1W	P	5	2	700	10	45	10	12	100	210	10	95R	270	15	11	CIRC	15		1
8	251745Z	14.5N 143.6W	SAT							PCN 1	UMSP										
9	261630Z	17.1N 143.4W	P	15	58	700	330	65	260	15	-	-	-	97C	284	9	7	CIRC	15		2
10	261844Z	17.2N 143.5W	P	30	15	700	40	50	300	10	60	270	5	97C	286	9	7	CIRC	18		2
11	261847Z	17.2N 144.0W	SAT	(15.0/5.0					/S/24HRS	NON	UMSP										
12	272117Z	17.0N 144.2W	SAT	(13.0/3.0					/W2.0/52HRS	PCN 1	UMSP										

### 5. POSITION AND VERIFICATION DATA-HURRICANES

HURRICANE IONE

1200Z 24 AUG TO 0000Z 26 AUG

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST					
POSIT		WIND		POSIT		WIND		ERRORS		POSIT		WIND		ERRORS		POSIT		WIND		ERRORS	
241200Z	12.9N 140.7E	85		12.9N 141.2E	90			29	5	12.9N 146.0E	90	191	-5	12.9N 150.8E	95	466	15	12.9N 155.0E	95	818	35
241800Z	13.0N 141.5E	85		13.0N 141.5E	85			0	0	13.0N 144.8E	85	134	-15	13.0N 148.0E	85	357	5	13.0N 151.3E	80	603	30
250600Z	13.3N 142.1E	85		13.3N 142.2E	85			6	0	13.6N 145.3E	80	150	-10	14.1N 148.3E	75	354	0	14.6N 151.4E	75	538	30
250600Z	13.7N 142.6E	90		14.0N 142.2E	80			29	-10	15.2N 144.3E	75	64	-10	16.5N 147.0E	65	247	0	18.0N 149.7E	60	324	25
251200Z	14.2N 143.0E	95		14.4N 143.5E	80			31	-15	15.5N 145.7E	75	132	-5	17.0N 148.5E	65	345	5	18.5N 151.0E	60	346	25
251800Z	14.7N 143.3E	100		14.7N 143.2E	100			6	0	15.9N 144.8E	85	104	5	17.2N 146.5E	70	232	20	18.3N 148.4E	60	105	25
260000Z	15.4N 143.5E	90		15.8N 143.7E	90			27	0	19.3N 145.8E	70	106	-5	23.5N 144.8E	45	250	0	26.0N 140.5E	30	580	-5
260600Z	16.1N 143.7E	85		16.0N 143.8E	90			8	5	18.0N 145.3E	70	131	5	21.1N 146.2E	45	147	10	24.7N 142.9E	30	490	0
261200Z	16.6N 143.7E	80		16.6N 144.0E	90			17	10	19.3N 144.7E	70	118	10	22.2N 143.0E	45	214	10	24.0N 139.0E	30	633	5
261800Z	17.2N 143.6E	80		17.3N 143.5E	75			8	-5	19.7N 143.1E	65	30	15	21.7N 140.8E	35	326	0	23.4N 137.0E	25	749	0
270000Z	17.7N 143.4E	75		18.5N 143.3E	70			48	-5	21.3N 140.6E	50	195	5	24.0N 136.6E	30	646	-5	26.0N 134.7E	30	798	0
270600Z	18.1N 143.0E	65		19.2N 142.8E	70			67	5	22.0N 139.6E	50	247	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
271200Z	18.7N 142.7E	60		19.8N 142.2E	70			71	10	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
271800Z	19.2N 143.0E	50		19.2N 143.3E	50			17	0	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
280000Z	19.5N 143.5E	45		19.4N 143.5E	30			6	-15	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
280600Z	19.5N 144.2E	35		19.4N 143.5E	30			--	--	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
281200Z	19.0N 144.9E	35		19.4N 143.5E	30			--	--	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
281800Z	18.5N 145.5E	35		19.4N 143.5E	30			--	--	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
290000Z	17.8N 146.1E	35		19.4N 143.5E	30			--	--	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
290600Z	17.3N 146.7E	30		19.4N 143.5E	30			--	--	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
291200Z	17.1N 147.6E	25		19.4N 143.5E	30			--	--	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0
291800Z	17.0N 148.5E	25		19.4N 143.5E	30			--	--	22.7N 138.5E	50	420	15	24.6N 134.7E	30	798	0	26.0N 134.7E	30	798	0

AVERAGE FORECAST ERROR  
AVERAGE RIGHT ANGLE ERROR  
AVERAGE MAGNITUDE OF WIND ERROR  
AVERAGE BIAS OF WIND ERROR  
NUMBER OF FORECASTS

HURRICANE WHILE WIND OVER 35KTS  
WARNING 24-HR 48-HR 72-HR  
25NM 164NM 326NM 482NM  
13NM 131NM 221NM 249NM  
6KTS 9KTS 6KTS 25KTS  
-1KTS 2KTS 5KTS 24KTS  
15 13 11 7

ALL FORECASTS  
WARNING 24-HR 48-HR 72-HR  
25NM 164NM 326NM 482NM  
13NM 131NM 221NM 249NM  
6KTS 9KTS 6KTS 25KTS  
-1KTS 2KTS 5KTS 17KTS  
15 13 12 10

## ANNEX B

### BAY OF BENGAL TROPICAL CYCLONE

#### 1. TROPICAL CYCLONE TRACK<sup>1</sup>

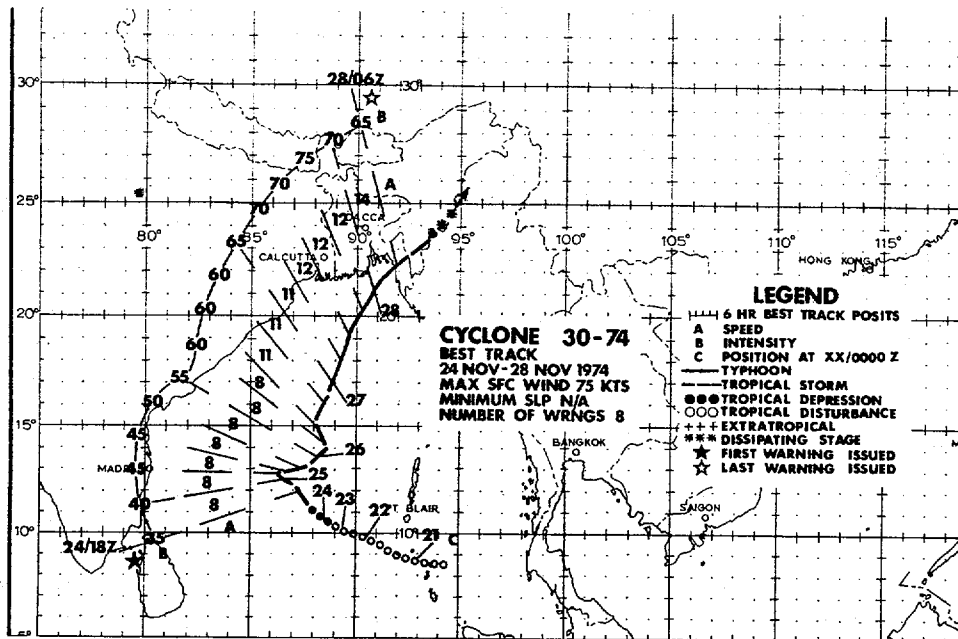


FIGURE B-1. Best track chart for Tropical Cyclone 30-74



FIGURE B-2. DMSP imagery of Tropical Cyclone 30-74, 24 November 1974, 0515Z



FIGURE B-3. DMSP imagery of Tropical Cyclone 30-74, 28 November 1974, 0230Z

<sup>1</sup> Tropical cyclones in the Bay of Bengal are numbered consecutively from the beginning of the calendar year and are included with those developing in the South Pacific and Indian Oceans.

## 2. CENTER FIX DATA

FIX POSITIONS FOR TROPICAL CYCLONE NO. 30-74  
2000Z 24 NOV TO 0800Z 26 NOV

FIX NO.	TIME	POSIT	FIX CAT	ALCRY NAV-MET	FIX LVL	FLI DIR	LVL VEL	WIND BKG RNG	MAX OBS SFC WIND VEL	MAX OBS WIND RNG	UBS MIN SLP	MIN 700MB HGT	FLT LVL	EYE FORM	ORIENT- TATION	EYE DIA	POSIT OF MAD&K	MSM NMDK
1	210007Z	4.0N 92.0E	SAT		111.0/1.0	/	/	FRST	PCN 5	UMSP								
2	220008Z	10.0N 90.0E	SAT		111.0/1.0	/S	/	20-RS	PCN 5	UMSP								
3	230009Z	11.0N 87.0E	SAT		111.5/1.5	/	/	12-RS	PCN 5	UMSP								
4	231302Z	11.5N 87.0E	SAT		(IR DATA				PCN 3	UMSP								
5	240015Z	12.5N 87.0E	SAT		112.0/2.0	/	/	FRST	PCN 5	UMSP								
6	240015Z	13.5N 87.0E	SAT		112.0/2.0	/	/	20-RS	PCN 3	UMSP								
7	241300Z	13.5N 87.0E	SAT		(IR DATA				PCN 5	UMSP								
8	241401Z	12.5N 85.0E	SAT		(IR DATA				NUN	UMSP								
9	241501Z	12.5N 85.0E	SAT		(IR DATA				PCN 5	UMSP								
10	241501Z	12.0N 87.0E	SAT		(IR DATA				PCN 5	UMSP								
11	250000Z	12.0N 86.0E	SAT		113.0/3.0	/01.0/20-RS			PCN 3	UMSP								
12	251311Z	12.0N 86.0E	SAT		(IR DATA				PCN 5	UMSP								
13	251311Z	12.0N 86.0E	SAT		(IR DATA				PCN 5	UMSP								
14	251300Z	12.0N 85.0E	SAT		(IR DATA				NUN	UMSP								
15	251300Z	12.0N 87.0E	SAT		(IR DATA				PCN 6	UMSP								
16	260000Z	13.0N 86.0E	SAT		113.5/3.5	/00.5/20-RS			NUN	UMSP								
17	260000Z	13.0N 86.0E	SAT		114.0/4.0	/01.0/20-RS			PCN 3	UMSP								
18	260000Z	14.0N 89.0E	SAT		(IR DATA				PCN 5	UMSP								
19	261000Z	14.0N 88.0E	SAT		(IR DATA				PCN 5	UMSP								
20	261000Z	14.0N 88.0E	SAT		(IR DATA				PCN 6	UMSP								
21	261000Z	14.0N 86.0E	SAT		(IR DATA				PCN 5	UMSP								
22	270000Z	17.0N 89.0E	SAT		(IR DATA				PCN 3	UMSP								
23	270000Z	17.0N 89.0E	SAT		114.0/4.0	/00.5/20-RS			NUN	UMSP								
24	270000Z	14.0N 89.0E	SAT		114.5/4.5	/00.5/20-RS			PCN 3	UMSP								
25	270000Z	14.0N 89.0E	SAT		(IR DATA				PCN 5	UMSP								
26	271000Z	14.0N 90.0E	SAT		(IR DATA				NUN	UMSP								
27	271000Z	14.0N 90.0E	SAT		(IR DATA				PCN 6	UMSP								
28	280000Z	11.0N 90.0E	LRUM															
29	280000Z	11.0N 91.0E	SAT		113.0/3.0	/01.5/20-RS			NUN	UMSP								
30	280000Z	12.0N 92.0E	SAT		113.5/4.0	/01.0/20-RS			PCN 5	UMSP								
31	281000Z	13.0N 93.0E	SAT		(IR DATA				PCN 5	UMSP								
32	281000Z	12.0N 91.0E	SAT		(IR DATA				PCN 3	UMSP								

## 3. POSITION AND VERIFICATION DATA

TROPICAL CYCLONE 30-74  
2000Z 24 NOV TO 0800Z 28 NOV

BEST TRACK				WARNING				24 HOUR FORECAST				48 HOUR FORECAST				72 HOUR FORECAST			
POSIT	WIND	WIND	WIND	POSIT	WIND	WIND	WIND	POSIT	WIND	WIND	WIND	POSIT	WIND	WIND	WIND	POSIT	WIND	WIND	WIND
241800Z	11.9N	87.2E	35	12.0N	87.0E	35	13	13.0N	86.0E	30	99	15.0N	85.0E	70	161	10	---	---	---
250000Z	12.5N	86.5E	40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
250600Z	12.7N	85.4E	45	13.2N	86.2E	45	38	15.0N	85.5E	70	198	17.0N	85.5E	90	218	20	---	---	---
251200Z	12.8N	86.7E	45	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
251800Z	13.0N	87.5E	50	13.2N	86.3E	50	71	15.1N	85.0E	70	170	17.0N	85.4E	90	220	15	---	---	---
260000Z	13.5N	88.2E	55	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
260600Z	14.2N	88.0E	60	14.7N	88.1E	60	42	16.0N	87.3E	75	90	18.0N	90.3E	90	234	25	---	---	---
261200Z	14.9N	88.2E	60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
261800Z	16.0N	88.0E	60	15.5N	88.0E	60	30	17.0N	87.7E	75	171	---	---	---	---	---	---	---	---
270000Z	17.1N	88.9E	65	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
270600Z	18.1N	89.3E	70	18.2N	90.0E	70	40	20.7N	91.0E	85	97	---	---	---	---	---	---	---	---
271200Z	19.2N	89.8E	70	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
271800Z	20.2N	90.3E	75	20.3N	90.9E	75	34	---	---	---	---	---	---	---	---	---	---	---	---
280000Z	21.3N	90.4E	70	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
280600Z	22.3N	92.1E	65	22.9N	92.0E	65	36	---	---	---	---	---	---	---	---	---	---	---	---
281200Z	23.2N	93.3E	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

AVERAGE FORECAST ERROR  
AVERAGE RIGHT ANGLE ERROR  
AVERAGE MAGNITUDE OF WIND ERROR  
AVERAGE BIAS OF WIND ERROR  
NUMBER OF FORECASTS

ALL FORECASTS  
WARNING 24-HR 48-HR 72-HR  
38NM 131NM 238NM 0NM  
22NM 81NM 146NM 0NM  
0KTS 0KTS 18KTS 0KTS  
0KTS 0KTS 18KTS 0KTS  
8 6 4 0

# APPENDIX

## ABBREVIATIONS, ACRONYMS AND DEFINITIONS

Abbreviations, acronyms and definitions which follow apply for the purpose of this report.

### 1. ABBREVIATIONS AND ACRONYMS

AC&W	Aircraft Control and Warning
AIRREP	Aircraft Weather Reports (Commercial and Military)
AJTWC	Alternate Joint Typhoon Warning Center
APT	Automatic Picture Trans- mission
AWN	Automatic Weather Network
AWS	Air Weather Service
CINCPAC	Commander in Chief Pacific
CINCPACAF	Commander in Chief Pacific Air Force
CINCPACFLT	Commander in Chief U.S. Pacific Fleet
CINCUSARPAC	Commander in Chief U.S. Army Pacific
DMSP	Defense Meteorological Satellite Program
ENVPREDRSCHFAC	Environmental Prediction Research Facility
FLEWEACEN/JTWC	Fleet Weather Central/ Joint Typhoon Warning Center
NAVWEASERVCOM	Naval Weather Service Command
NESS	National Environmental Satellite Service
NOAA/NWS	National Oceanic and Atmos- pheric Administration, National Weather Service
PACOM	Pacific Command
SLP (MSLP)	Sea Level Pressure (Minimum Sea Level Pressure)
TCARC	Tropical Cyclone Aircraft Reconnaissance Coordinator
TC	Tropical Cyclone
TD	Tropical Depression
TS	Tropical Storm
TY	Typhoon
WMO	World Meteorological Organization

### 2. DEFINITIONS

ALTERNATE JOINT TYPHOON WARNING CENTER - The AJTWC is Detachment 17/Asian Tactical Forecast Unit, 20th Weather Squadron, Yokota, Japan operating in coordination with the Naval Weather Service Facility, Yokosuka, Japan.

CYCLONE - A closed atmospheric circulation rotating counterclockwise (clockwise) in the Northern (Southern) Hemisphere.

EXTRATROPICAL - A term used in warnings and tropical summaries to indicate that a cyclone has lost its "tropical characteristics". The term implies both poleward displacement from the tropics and the conversion of the cyclone's primary energy source from release of latent heat of condensation to baroclinic processes. The term carries no implication as to strength or size.

EYE/CENTER - Refers to the roughly circular central area of a well developed tropical cyclone usually characterized by comparatively light winds and fair weather. If more than half surrounded by wall cloud, the word "eye" is used, otherwise the area is referred to as a center.

MAXIMUM SUSTAINED WIND - Maximum surface wind speed, over water, in a cyclone averaged over a 1-minute period of time. Wind speed is subject to gusts which bring a sudden short duration (i.e., on the order of a few seconds) increase in speed. Peak gusts over water average 20 to 25 percent higher than the sustained 1-minute wind speed.

SIGNIFICANT TROPICAL CYCLONE - A tropical cyclone becomes "significant" with the issuance of the first numbered warning by the responsible warning agency.

SUSPICIOUS AREA - An area suspected of containing a developing or existing tropical cyclone.

TROPICAL CYCLONE - A synoptic scale non-frontal cyclone developing over tropical or subtropical waters, having a definite organized circulation and warm core.

TROPICAL CYCLONE AIRCRAFT RECONNAISSANCE COORDINATOR - A CINCPACAF representative designated to levy tropical cyclone aircraft weather reconnaissance requirements on reconnaissance units within a designated area of the PACOM and to function as coordinator between CINCPACAF, aircraft weather reconnaissance units, and the appropriate typhoon/hurricane warning center.

TROPICAL DEPRESSION - A tropical cyclone in which the maximum sustained surface winds are 33 knots or less.

TROPICAL DISTURBANCE - A discrete system of apparently organized convection, generally 100 to 300 miles in diameter, originating in the tropics or sub-tropics, having a non-frontal migratory character and having maintained its identity for 24 hours or more. It may or may not be associated with a detectable perturbation on the wind field. As such, it is the basic generic designation which, in successive stages of intensification, may be subsequently classified as a tropical depression, tropical storm, or typhoon.

TROPICAL STORM - A tropical cyclone with maximum sustained surface winds in the range of 34 to 63 knots, inclusive.

TYPHOON/HURRICANE - A tropical cyclone in which maximum sustained surface winds are 64 knots or greater. West of 180 degrees longitude the name TYPHOON is used and east of 180 degrees longitude the name HURRICANE is used. All descriptive references to typhoons apply equally to hurricanes.

SUPER TYPHOON - A typhoon with maximum sustained surface winds greater than or equal to 130 knots.

WALL CLOUD - An organized band of cumuliiform clouds immediately surrounding the central area of a tropical cyclone.

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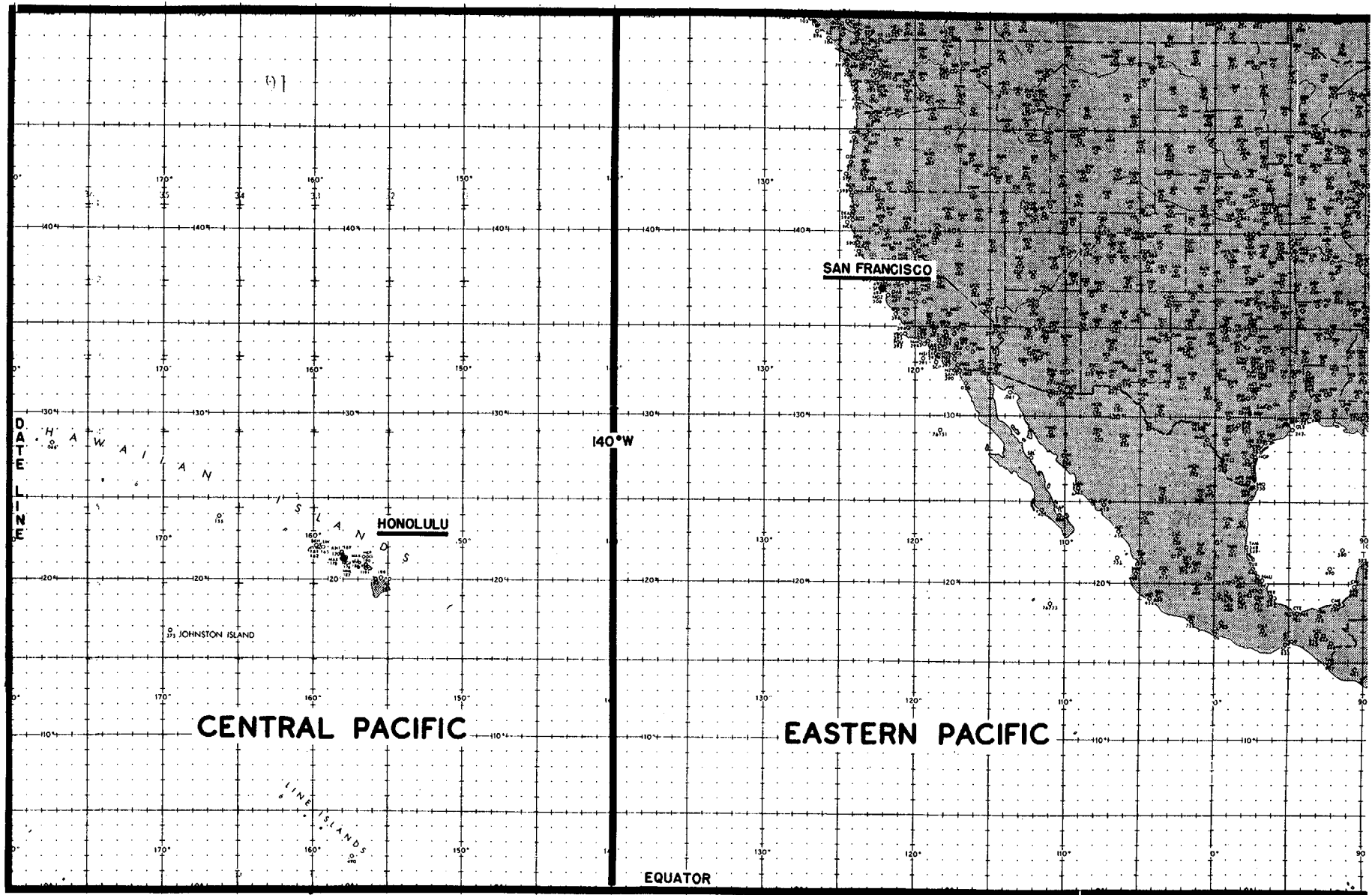
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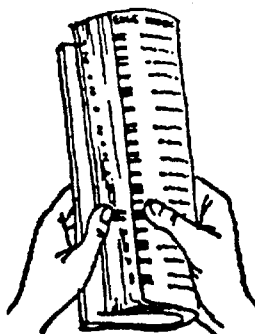




**Areas of Responsibility - Central and Eastern Pacific Hurricane Centers**

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CHAPTER II Reconnaissance and Communication

CHAPTER III Research Summary

CHAPTER IV Summary of Tropical Cyclones

CHAPTER V Summary of Forecast Verification Data

ANNEX A Summary of Tropical Cyclones in the Central North Pacific

ANNEX B Bay of Bengal Tropical Cyclones

APPENDIX Abbreviations, Definitions and Distribution